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NOVEMBER 1922

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Industrial and Vocational Teacher Training

Homer J. Smith, The University of Minnesota

ARTICLE III—Conclusion.

Are Present Curricula Well Designed?

TABLES 4 and 5 show the types of courses comprising the fifty curricula mentioned earlier. Article 2 dealt with the representativeness of the institutions examined and the manner in which their offerings were canvassed. The present writing attempts to evaluate these offerings and to suggest modifications.

It will be noted that content courses are much in excess of the professional work in all cases. *Content Academic* refers to English, history, health and sanitation, citizenship, mathematics, science, psychology, economics, etc. *Content Shop* and *Content Drawing* mean course in which theory and practice are given and skill developed through lectures, recitations, and shop and laboratory work. Where titles and descriptions of courses indicated discussion of the technique of teaching these various subjects, they were listed under either *Methods and Supervision* or *Observation and Practice.* The other headings of the charts below are self-explanatory, except that it is necessary to say that the *elective* columns list both academic and manual courses used for the completion of required numbers of credits.

Table Four. Percentage Classification of Courses in Twenty-Five Two-Year Curricula.

* No.	Content Acad.	Content Shop	Content Draw.	Meth'ds & Super.	Obser. & Prac.	Ad-min.	Ed. Psy.	Ed. Sociol.	Elec-tive
1	32	15	13	3	15	4	4	—	13
2	25	24	19	10	10	7	5	—	—
3	38	44	5	4	2	5	2	—	—
4	54	18	12	4	4	7	—	—	—
5	28	28	7	17	7	—	7	3	3
6	11	22	11	15	4	—	—	—	37
7	23	26	15	10	5	10	5	—	6
8	6	18	15	9	12	11	11	—	18
9	15	42	16	—	5	8	5	—	9
10	26	22	11	11	11	—	11	—	8
11	30	17	13	13	13	—	5	—	9
12	25	28	—	9	13	2	6	—	17
13	18	44	6	8	6	12	16	—	—
14	70	26	—	—	—	—	—	—	4
15	16	36	12	7	6	7	6	5	5
16	35	25	12	—	22	6	—	—	—
17	20	12	33	12	6	4	5	—	8
18	48	16	10	7	—	4	10	—	5
19	17	38	22	10	3	6	4	—	—
20	18	33	22	9	5	7	5	—	—
21	53	7	6	6	6	15	7	—	—
22	35	21	15	10	5	10	5	—	6
23	25	34	21	4	5	4	7	—	—
24	11	23	36	6	15	—	4	—	4
25	23	31	20	6	12	3	3	2	—
Ave.	28	26	14	7	8	5	5	1	6

*Numbers correspond to the institutions concerned; a reference list will be mailed upon request to the author.

Table Five. Percentage Classification of Courses in Twenty-Five Two-Year Curricula.

* No.	Content Acad.	Content Shop	Content Draw.	Meth'ds & Super.	Obser. & Prac.	Ad-min.	Ed. Psy.	Ed. Sociol.	Elec-tive
1	40	10	7	4	—	14	5	—	20
2	27	27	10	5	5	9	3	3	11
3	38	33	11	4	8	4	2	—	—
4	16	44	19	3	3	9	3	3	—
5	16	26	11	2	4	10	6	—	25
6	50	26	4	6	1	9	2	—	2
7	26	21	17	10	—	10	4	—	12
8	14	40	10	4	4	8	2	2	16
9	29	43	6	7	1	10	2	2	—
10	57	14	10	4	1	7	1	—	6
11	36	19	6	3	—	3	1	—	32
12	45	25	12	—	3	7	6	2	—
13	32	20	8	5	5	9	5	—	16
14	45	16	9	8	—	12	3	—	7
15	34	18	18	10	—	4	2	—	14
16	37	20	12	2	4	3	2	—	20
17	17	24	10	7	2	8	2	—	30
18	50	14	13	3	6	—	—	2	12
19	46	21	7	6	—	12	4	4	—
20	35	20	5	—	—	20	—	—	20
21	38	20	10	7	2	5	1	—	17
22	50	19	10	21	—	10	1	—	3
23	26	25	10	9	—	5	10	—	15
24	35	25	17	4	3	9	5	2	—
25	46	31	5	8	2	3	2	2	—
Ave.	35	24	10	6	2	8	3	1	11

*Numbers correspond to the institutions concerned; a reference list will be mailed upon request.

Table Six permits of comparison of the two lengths of curricula. Averages of the 25 schools in each group afford a rough measure of the emphasis placed upon various classes of courses, but the ranges of percentages in each type of work serve further to make clear the differences which the training periods of unequal length make possible. Two-year offerings on the average require slightly less *academic content,* but we find a greater variance in practice than is found in four-year institutions. In *shop content* the two-year offering is greater both in average and in ranges, and the same is true of *content drawing, observation and practice,* and *educational psychology.* Almost double the amount of election is permitted in the four-year institutions.

Considering the averages, as modified by the corresponding ranges, we may say that two-year institutions give most stress to *shop content, drawing content, methods and supervision, observation and practice,* and *educational psychology.* Four-year institutions give most stress to *academic content, administration,* and *electives.* These would be significant facts were comparison being made of two kinds of curricula unlike in respects other than length, for example, offerings in the

Table Six. Two-Year and Four-Year Curricula Compared.

Classes of Courses and the Percentage of Credits Required in each class.

Classes of Courses	Averages of Credits Required (Per Cents of Total Requirements)		Ranges of Credits Required (Per Cents of Total Requirements)	
	2-year	4-year	2-year	4-year
Content Academic	28	35	6-70	15-57
Content Shop	26	24	7-44	10-44
Content Drawing	14	10	0-36	4-19
Methods and Supervision.	7	6	0-17	0-21
Observation and Practice.	8	2	0-22	0- 8
Administration	5	8	0-15	0-20
Educ. Psychology	5	3	0-16	0-10
Educ. Sociology	1	1	0- 5	0- 5
Electives	6	11	0-37	0-32

The first vertical column, **Averages of Credits**, is carried from Table Four and the second from Table Five. See distributions of averages at the ends of these tables. The third and fourth columns, **Ranges of Credits**, are also derived from these two tables. The smaller and the larger number in each case is the least and the greatest percentage of credits, in the class of courses named opposite, that is required in any of the twenty-five curricula examined. These ranges are shown so that the offering of an institution in any type of work may be compared with the average of twenty-five schools.

The table should be read as follows: The average two-year institution requires 28 per cent of Academic Content work in comparison with 35 per cent required by the average four-year institution. The lowest per cent of Academic Content required in any two-year institution is six and the highest 70; in the case of four-year institutions, fourteen per cent is the least and 57 per cent is the greatest requirement for this class of courses.

East and in the West. One having twice the duration of the other, however, we must conclude that the four-year preparatory period is best largely because it makes possible more experiences and broader training, both general and professional. It is interesting to note, in passing, that the typical offerings in these two definite lengths are very much alike. Our next step is to see in what measure they contribute to the teaching fitness brought out as desirable in earlier pages.

Evaluation.

The ten characteristics named as desirable throughout this paper are here listed. It will doubtless be appreciated that they are unequally affected by school training.

1. Adaptability and tact.
2. Executive ability and class management.
3. General scholarship.
4. Knowledge of the subject to be taught.
5. Good character.
6. Personality.
7. Health and appearance.
8. Industrial experience or contact.
9. Methods.
10. Professionalism.

(1) *Adaptability and tact* is dependent upon social contacts and thorough understanding of the situations commonly faced in teaching work. Intercourse with instructors and with large numbers of experienced teachers and cadets, as well as class instruction and readings, modify the preparation of a man to conduct himself wisely when he has left the institution, but the extent of such preparation cannot be easily measured. (2) *executive ability,* (5) *good character,* (6) *personality,* and (7) *health and appearance* are all likewise developed and strengthened through life in a school, but we have not yet learned to measure them in terms of amount. Courses and counsel and associations contribute also to the growth of (10) *professionalism,* but this attribute is similarly difficult to gauge. It is certain, however, that courses in education are most significant in training for this quality.

The remaining characteristics—*class management, general scholarship, knowledge of the subject to be taught, methods,* and *industrial experience or contact*—can be quite readily checked with what a given school or the typical school exacts in training, but in their larger aspects only. We have not gone far yet in detailed evaluation of them. This checking we shall attempt to do with special reference to the four types of teachers under consideration in this study.

The Manual Arts Teacher.

For this teacher, the five measurable characteristics have been given the following order of importance, by approximately 300 competent individuals:—Knowledge of the Subject to be Taught, Class Management, General Scholarship, Methods and Industrial Experience or Contact.

Knowledge of the Subject to be Taught, for this teacher, has long meant the ability to work with common tools and machines in wood and in some other media as well as a knowledge of the materials used in the school shop. It has meant, also, possession of skill in the use of drawing instruments and the ability to interpret sketches. Approximately 35 per cent of the credits required for graduation from the institutions considered are allotted to shopwork and drawing, which seems a proper recognition of this first-named characteristic.

Class Management and *Methods* are well accounted for by a total of approximately sixteen per cent of the time being given to educational psychology, to methods and supervision, and to observation and practice.

General Scholarship, so necessary for the maintaining of proper standards of pupil improvement and for desirable correlation of the industrial with the more academic phases of schoolwork, is well provided for by approximately 32 per cent of the time being given to academic content subjects.

Industrial Experience or Contact being not a school subject, is, however, provided by what may have been learned in institutions before the actual industrial experience was had. On the other hand, experience gained before enrollment at an institution would make for greater progress in school shopwork and for closer organization of materials selected later for courses. A tendency on the part of some schools to require some practical experience supplementary to institutional work is noted. It is wholly possible through cooperative schemes to offer courses rich in contacts with commerce and industry. *Considering the requirements of the manual arts teacher, we can say that existing curricula are fairly adequate.*

General Industrial Teacher.

For this teacher, the measurable characteristics are given a changed order and we have reason, therefore, to suggest a somewhat changed emphasis in the offerings of institutions:—Knowledge of the Subject to be Taught, General Scholarship, Class Management, Industrial Experience or Contact, and Methods.

Knowledge of the Subject to be Taught, for this teacher, presupposes a broader offering of shop and drawing content. The accumulation of credits in one type of shopwork will not give adequate preparation, for the general industrial teacher is expected to offer elementary experiences in a variety of industrial processes and mediums. The training institutions offer a variety of vocational experiences but whether or not they are required or merely open to election could not be determined in most cases. The amounts of time allotted to shop and drawing courses seem adequate.

Likewise, *General Scholarship,* should be a strong factor in his equipment. He is expected to develop skills and to impart knowledge of materials, but his greatest responsibility is the giving of varied, practical experiences and the building up of connections such that his students will better understand the world about them and what men are doing in it. His is a service for social adaptiveness. His offering is generally educational, necessary for all students and sufficient of its kind for the great majority. This responsibility points to much mixed shopwork and drawing, much academic content, more psychology and more sociology than is now offered within the scope of the required courses. It points also to more courses in administration, because he must have a proper conception of the aims and organizations of the various institutions in which he may be employed. He needs to be acquainted with elementary, junior, and senior high school problems.

We may conclude that, for the general industrial teacher, present curricula are not so satisfactory as for the manual arts teacher. Percentages of administration, educational psychology, and educational sociology may well be raised. There should be assurance also of variety in the shop offering, a little of many rather than much of one type of industrial experiences being the ideal. Either the requirement should be more definitely made to this end or the student should be advised to choose electives to satisfy this special need.

Vocational Shop Teacher.

For this teacher, we have still another order of characteristics and are led to see that emphasis must be placed on somewhat different courses than in either of the two cases previously discussed:—Knowledge of the Subject to be Taught, Industrial Experience or Contact, Class Management, Methods, and General Scholarship.

Knowledge of the Subject to be Taught being placed highest in the case of the vocational shop teacher, means that great stress must be laid upon shop and drawing courses. His great necessity is the possession of many skills within a given trade field and the ability quickly and accurately to interpret the most complicated working drawings which may be employed in that field. His preparation in both technical matter and skill must be intensive, which fact suggests long-continued experiences in the types of work in question. His work is not general in any sense, for he confines his efforts to shop-work in advanced courses of vocational departments and vocational schools—day, evening, and part-time.

Industrial Experience or Contact are for him extremely essential and his school shop training fits him admirably to get quickly the additional viewpoints and new processes which the practical outside work has to contribute. If institutions continue to prepare this type of instructor, we may expect great extension of a practice now beginning—that of requiring actual trade experience of named kind and quality in lieu of graduation. Cooperative schemes will make possible this same kind of preparation if the agreements entered into with employers guarantee that the students shall have experiences nearly approaching actual work-world conditions.

Class Management is for the vocational shop teacher largely shop management, with which he may be familiar, because he will commonly do more by way of individual instruction than by group teaching.

Methods needs to be less emphasized; not that ability in methods is less important for him, but because there is little variety in the teaching situations with which he can be confronted. His methods work should be definite, narrow in scope, but intensive.

General Scholarship has been placed last in order of importance for this teacher, by the three hundred men cooperating in this study, and we feel justified in placing this percentage at a much lower figure than present curricula show. It should not be thought that vocational shop teachers are handicapped by scholastic attainment; the inference is rather that such attainment contributes little to the tangible results of their efforts. They being in all other respects well prepared for their work, their influence upon students and their value to the school and the profession will rise with the increase of general scholarship. *We conclude that the present training offerings do not well meet the needs of men preparing for vocational shop teaching.*

Related Subjects Teacher.

For this fourth type, we have still another rank order of the five measurable characteristics:—Knowledge of the Subject to be Taught, Class Management, General Scholarship, Industrial Experience or Contact, and Methods.

Knowledge of the Subject to be Taught means, in this case, grasp of mathematics, drawing, science, safety and such other subjects as are necessary supplements to skill in trade occupations. Considerable time must be allotted for these content courses, because both theoretical and practical work must be taken. Not alone must the knowledge gained be both general and technical, but it must be selected from many fields, including courses in most of the branches of engineering. This means laboratory and shop requirements in addition to text and lecture courses. It involves prerequisites and the exaction of credit in groups of courses, so that the percentages in academic content, shop content, and drawing content must all be high. All technical knowledge must

be interpreted in the light of specific vocational demands, industrial experience or contact being, therefore, highly desirable. Methods, supervision and practice, and administration are more important for the related subjects teacher than for the vocational shop teacher. *Present curricula do not seem designed for the training of the best type of related subjects teachers.*

General Summary and Conclusions.

1. There is confusion among industrial and vocational teachers and administrators, shared naturally by their fellow workers in more academic fields, regarding the preparation of teachers of industrial subjects in our schools. We do not think uniformly about the requirements of the varying types of classwork. Until we do reach conclusions more definite and similar, we cannot design correct training experiences so necessary for the right conduct of our courses and for their justification as worthwhile preparation for the young.

2. The following four types of teachers are recognized and most frequently referred to in our literature, and brief explanation of the service of each has been given above:—Manual Arts Teacher, General Industrial Teacher, Vocational Shop Teacher, and Related Subjects Teacher.

3. Nine characteristics of fitness are thought to be necessary, in some degree, for all teachers. Brief definitions of these attributes and attainments will be found in an earlier section of this paper:—Adaptability and Tact, Executive Ability and Class Management, General Scholarship, Knowledge of the Subject to be Taught, Good Character, Personality, Health and Appearance, Methods, and Professionalism. A tenth characteristic, Industrial Experience or Contact, was found to be necessary in the consideration of the various divisions of industrial and vocational classwork. It is a highly desirable characteristic for some types of teachers, and cooperative schemes have begun to be employed to give experiences closely paralleling actual full-time employment.

4. The degree to which any of the foregoing ten characteristics should be possessed by a teacher is dependent upon the type of work which that teacher is to perform in the schools. The requisites for success in the four kinds of service are not identical. They are sufficiently dissimilar to warrant different kinds and amounts of teacher preparation.

5. All ten characteristics are essential but of varying importance and have been given rank order and relative position, from an arbitrary point of low importance, for each of the four kinds of teachers. These rank orders and positions are the combined judgments of almost three hundred persons competent, by reason of experience and positions, to give expert opinions.

6. The differences are such that standards of fitness may be expressed roughly in amounts of the ten characteristics previously named. The order in which they should be considered by one called upon to select a person for a type position has been shown above, the four cases being different.

7. The judgments of groups of individuals similarly employed are found to be in close agreement. These groups are as follows:—

State and federal supervisors of industrial and vocational education.

Supervisors of industrial education in cities of 50,000 and more population.

Heads of industrial teacher-training departments and institutions.

Teachers-in-service and teachers-in-training.

8. The initial training for any type of industrial or vocational teaching should be of considerable duration. Mixed courses are valuable as agencies for upkeep and help on immediate problems, but well-designed curricula seem necessary for introduction to the profession.

9. The percentages of varying kinds of courses in present two-year and four-year offerings are similar. More election is permitted at four-year institutions and more attention is given in the two-year curricula to methods and practice. Content courses are allotted much more time than professional courses in all cases.

10. Present curricula do not seem equally well adapted for the preparation of the four types of teachers, and one standard curriculum, even though generous in elections, seems not to be sufficient. The needs of manual-arts teachers seem to be most closely met at present, probably because existing offerings have been developed with this special group in view. For the general industrial teacher we feel that more emphasis is necessary upon administration and upon related psychology and sociology. There should be assurance, also, that the shop offering is extensive rather than intensive for this teacher. At present there is no definite requirement of this nature and in few cases is there suggestion that electives in shopwork be scattered. The vocational shop teacher may well be offered intensive training within one field or two allied fields. General scholarship does not receive a high premium in this case, and methods may be given in less time because the teaching later to be done will be largely individual presentation rather than group work. The related subjects teacher seems to need much lecture and laboratory work scattered in various engineering fields, so that there would be in his special curricula a preponderance of credit in content courses—academic, shop, and drawing.

11. To these ends suggestive precentage classifications of courses for four types of teaching are shown below for comparison and for checking against two-year and four-year offerings. The classes of courses were chosen arbitrarily and are the ones used in evaluation of the fifty curricula examined and tabulated in earlier pages. These percentages have been set with full consideration of the service expected from teachers of each type and of the worth of the various kinds of courses in providing needed experiences. Quantitative analysis

SUGGESTED CURRICULAR CONTENT.

Kinds of Courses	Manual-Arts Teacher	General Industrial Teacher	Vocational-Shop Teacher	Related Subjects Teacher
Acad. Content	25%	28%	15%	35%
Shop Content	20%	20%	35%	20%
Draw. Content	10%	10%	20%	15%
Methods and Super....	10%	5%	5%	5%
Obser. and Practice...	10%	5%	3%	5%
Administration	10%	12%	7%	5%
Ed. Psy.	3%	6%	3%	3%
Ed. Sociol.	2%	4%	2%	2%
Electives	10%	10%	10%	10%

supporting these suggestions was not attempted, as little is now known about the technique of evaluating courses of study in terms of amount of given qualities of fitness. These suggestive amounts of the different kinds of work seem adapted to curricula of any length.

The numbers are to be read as per cents of the total credits required, under any system of credit accounting. The distributions suggested are not worthy of blind acceptance. They are based upon the combined opinions of three hundred competent persons and are to that extent more reliable than personal judgment. What courses should be included in these four cases and what their contents should be are worthy of the most careful consideration. It is hoped that a point of departure for such a study has hereby been, in some measure, established.

Plan for the Organization of Vocational and Trade Education in the Detroit Public Schools

Arthur B. Moehlmann, Director of Statistics, Detroit Board of Education

PROBLEM.

THE problem faced by Superintendent of Schools Frank Cody has been to develop an organization that will care adequately for the technical and vocational educational program upon the completion of the Detroit Cass Technical High School. The vital question of policy of whether this school shall develop as a vocational high school, a trades school, or a combination of both, was settled in favor of a vocational high school. All development of organization has been considered in the light of this decision.

THE SITUATION.

Vocational education as it now exists in Detroit is separated into a technical and commercial school under separate principals. The pupils are housed in the present Cass, one section of the new plant, the Vocational school, the Burton school and the Wilkins High School of Commerce, as follows:

Regular Day School.		
Cass High School Students	2302	
High School of Commerce	806	
Boys' Vocational Classes	41	
Total Day Schools	—	3149
Continuation.		
Soldiers' Rehabilitation Classes	510	
Continuation Classes (Cass)	2062	
Continuation Classes (Wilkins)	149	
Total Continuation Classes	—	2721
Evening Classes (Adult).		
Evening Classes (Cass)	2635	
Evening Classes (H. S. of Commerce)	651	
Total Evening Classes	—	4286
Grand Total		10156

Present Organization of Cass Tech.

The present organization of Cass Technical High School is described by the principal as a "departmental organization." The school is divided into groups or departments upon the basis of vocational activities. This plan was evolved to develop a solidarity that, according to the principal, would otherwise have been impossible in a school with so many diverse activities.

The administrative unit is the department. The head not only organizes and supervises departmental instruction but exercises a large amount of administrative control as well. He is responsible for the general welfare of all students majoring in his department.

The registrations are under the direction of Assistant Principal Allen. The assignment to classes is made by the group sponsors.

The Cass Technical High School organization is under the general direction of a principal, two assistant principals, four administrative division heads and nine department heads whose work is a combination of instruction and administration.

1. The Principal.

The principal, Mr. Benj. F. Comfort, has general supervision of all activities in the building and reserves for direct administration the following:

1. Operation of buildings. The janitors and engineers are directly under the principal.
2. All matters relating to school discipline.
3. Supervision and direction of the lunchroom.
4. Direction of the library. The head of the English department exercises supervisory control of the library.
5. All matters connected with teachers, viz: appointments, leaves of absence, etc.
6. A clerk is responsible for credits, alumni records, reports and pay-rolls.
7. Control of athletics through the medium of an appointed faculty committee. The ranking instructor of the physical education department is automatically a member of this committee.
8. Control of school publications through the medium of an appointed faculty committee. The English department exercises supervisory control of school publications.
9. Direction of the R. O. T. C. which is in charge of a lieutenant in the regular service.

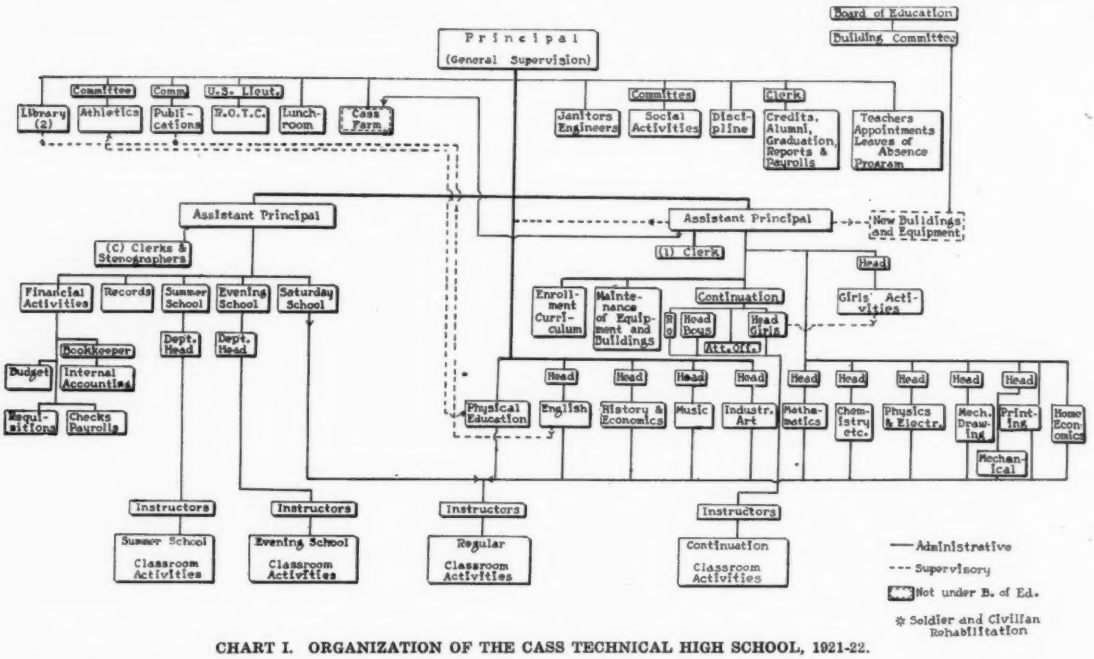


CHART I. ORGANIZATION OF THE CASS TECHNICAL HIGH SCHOOL, 1921-22.

10. General direction, with Mr. Allen, of Cass Farm, which, while not under the control of the board of education, has been approved by it.

11. Administrative control of the following departments:

a. Physical Education
b. English
c. History and Economics
d. Music
e. Industrial Arts

2. Assistant Principals.

The duties of the assistant principals are not divided on a strictly academic and non-academic basis. This has been due to conditions arising from plant enlargement and rapid growth. The detailed duties of these men are:

A. Assistant Principal.

1. General charge of registration and development of the curriculum. While the principal has administrative control of the five departments noted above, this assistant principal, in charge of registration and curriculum, has a supervisory relationship to all departments.

2. Direct charge of the departments of:

a. Mathematics
b. Chemistry
c. Physics and Electricity
d. Mechanical Drawing
e. Mechanical Department
f. Printing
g. Home Economics

3. Administrative control of all continuation activities, including soldier and civilian rehabilitation. The boys' and girls' divisions in this section are in charge of two division heads.

4. Charge of maintenance of equipment and of buildings.

5. A supervisory relationship, under the direction of the building committee of the board of education, to the new building and equipment for the same.

6. Administrative control of girls' activities. These are under the immediate direction of a department head who divides her time between regular day school and continuation activities.

B. Assistant Principal.

1. Administration of summer school through one of the regular department heads who acts as administrative assistant.

2. Administrative control of the evening school through administrative division head.

3. General supervision of the Saturday school.

4. Administration of financial accounts, preparation of the annual budget.

a. Requisition for his supplies and equipment
b. Internal accounting
c. Checks and pay-rolls

5. Administration of internal records. This function is divided, as the principal's clerk makes out all reports and pay-rolls without any definite relationship between her work and that of the assistant principal.

Department Heads.

The nine department heads whose duties are a combination of instruction and administration are the heads of the following departments under the control of the principal:

MAIN FRONT, CASS TECHNICAL HIGH SCHOOL, DETROIT.

1. English
2. History and Economics
3. Music
4. Industrial Art
5. Physical Education[1]

Under the direction of an Assistant Principal:

6. Mathematics
7. Chemistry
8. Physics and electricity
9. Mechanical drawing
10. Mechanics
11. Printing[1]
12. Home Economics[1]

The present organization is shown in detail in Chart 1.

[1]The departments of Physical Education, Printing and Home Economics are without heads.

High School of Commerce Organization.

The operation of the High School of Commerce is under the following organization:

Principal
Clerk
Bookkeeper
Attendance Teacher and Evening Principal
Attendance Officer
Department Chairmen
One teacher in charge of junior and senior continuation department
Teachers

The principal is in charge of all school activities, and teachers and clerks are responsible to him for final results of any work to which they may be assigned; this includes class instruction as well as special activities. The principal makes out the pupils' programs, and the

assignment of classes, being assisted by a group of teachers, and is responsible for the course of study.

There are no department heads, the supervision of instruction is done by the principal, assisted by department chairmen or senior teachers. The teaching program of these teachers is not shortened for this purpose (except for the English chairman), but they have been selected because of their special fitness, and willingness to work.

The work of the engineers and janitors is under the principal.

The clerk keeps the permanent records of all students, is in charge of the pay-roll, under the supervision of the principal, and is responsible for all reports that are to be furnished to the superintendent's office. She also keeps the attendance record of the continuation students, their working permits and where they are employed. The clerk is able to furnish any data that may be required relative to former and present students.

The bookkeeper is in charge of the bookstore, and is responsible for carrying out the details involved in ordering books and supplies, selling the same to the students, and keeping the books so that they may be audited monthly by the high school auditor. The bookkeeper also gives a part of her time each day to recording the absence of students, and the general office work of the school.

The attendance teacher is in charge of investigating absent students, consulting with them on their return to school, and issuing permits to them to re-enter their classes. He directs the attendance officer as to the absent students that should be looked up each day and has general supervision of all delinquent students. He also is in touch with the different teachers as to ability of students to do satisfactory work with a full schedule of classes, and makes recommendations for weak students to carry a lighter program. Approximately one-half a teacher's time is given to this work, the balance is given to teaching and supervising classes. This teacher is also principal of the evening school.

The attendance officer devotes her entire time to following up absent students, and educating the parents to the importance of having their children attend school regularly.

The department chairmen preside at the meetings of teachers having the same subjects, where the problems affecting the teaching of same are evolved. They also arrange for uniform tests and the grading of students.

The teacher in charge of the junior and senior continuation students' consults with the students in this department, keeps in touch with the permit department of the vocational bureau, and interviews employers who have continuation students in their employ. He also is expected to supervise the work of the teachers in this department.

The teachers are responsible for the results of their classroom activities. They are also called upon from time to time for service in connection with special activities of the school. This organization is shown in Chart 2.

Ultimate Organization of Vocational Education. Vocational education falls logically into two groups: (1), the vocational high school, and (2), the trade or short course school. The work of both types of schools divides easily along lines of closely related group development. These groups are:

1. Mechanical Group
2. Applied Science Group
3. Home Making and Related Courses Group
4. Arts and Crafts Group
5. Commerce Group

In any logical development of this branch of education, it is impossible to ignore the close relationships

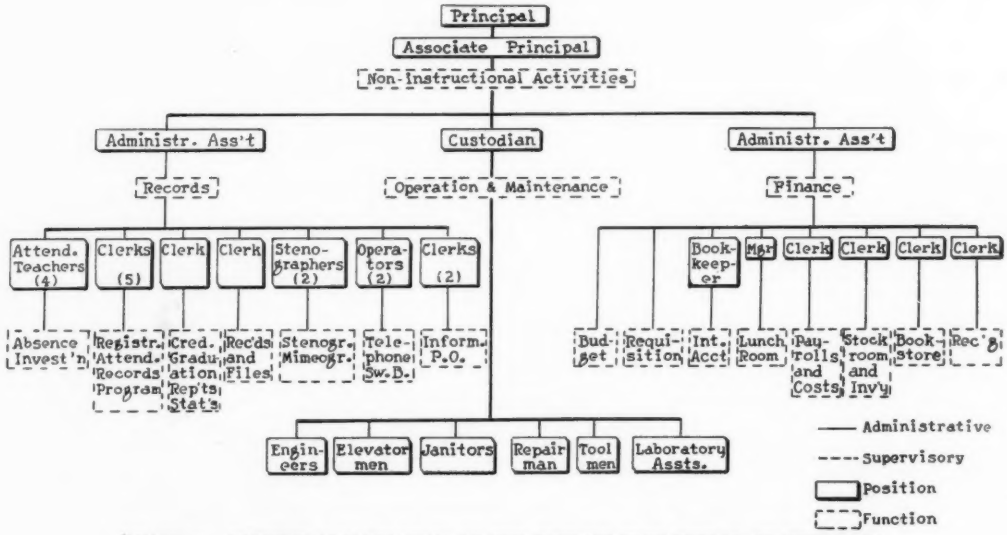


CHART II. PRESENT ORGANIZATION OF THE DETROIT HIGH SCHOOL OF COMMERCE.

A LABORATORY IN THE CASS TECHNICAL HIGH SCHOOL, DETROIT, MICH.

that exist between these groups. They should be developed as a single unit under one administration, in both vocational and trades school.

The following organization plan is based upon the assumption that the best educational interests would be served by combining the present commerce unit with the vocational high school and organizing these five groups of activities under a single administration.

The ultimate organization recommended for the Cass Vocational High School follows:

ULTIMATE ORGANIZATION, CASS TECHNICAL HIGH SCHOOL.

General Situation.

There are two groups of instructional activities within the school, each of which presents a separate and specialized administrative problem. They use the building from 8 a. m. until 10 p. m. They are:

1. Regular day school activities. Full time instruction for regular students of high school age.

2. Senior continuation or adult education activities.

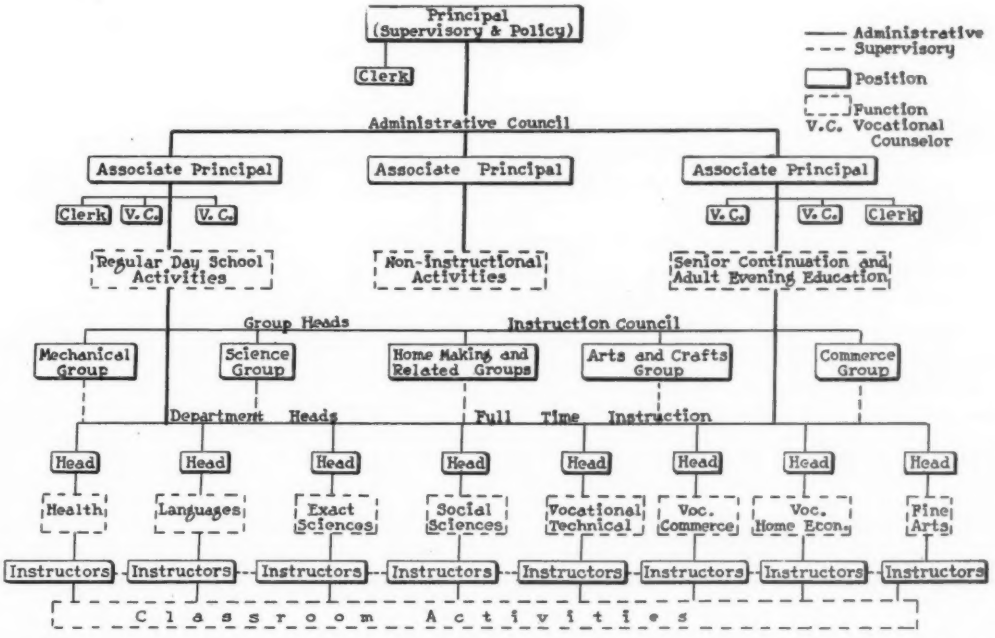


CHART III. THE NEW ORGANIZATION OF THE CASS TECHNICAL HIGH SCHOOL, WHICH IS JUST GOING INTO EFFECT.

LUNCH ROOM, CASS TECHNICAL HIGH SCHOOL, DETROIT.

Rehabilitation work for both soldiers and civilians, part time work for employed adults who work on night shifts, and for the employed adults in the evening along lines of present or parallel specialization.

Each of these divisions should be considered as an individual administrative problem. The non-instructional activities for each group are similar in character and may be classified as a single problem.

It is essential in building a workable school organization to recognize the importance of both administration and supervision, avoiding the common mistake of strengthening one and neglecting the other at the expense of general educational efficiency.

There must be proper balancing and adjustment of the curriculum in every type of school. Even in a technical school where the training is highly specialized the primary function of public education, the development of good citizens, must not be slighted. Whether the student be full or part time, provision must be made for the inclusion of the work that will make for better citizenship and greater individual happiness.

The development of the Cass organization has been approached from the standpoint of the needs and general policy of the city schools as a whole, with careful attention to the details of the particular building to include all of its problems.

GENERAL ORGANIZATION.

Administration.

The general organization is planned upon the basis of the educational differentiations mentioned in previous pages. The administration of the building will be under the direction of a principal and three associate principals divided as follows:

1. Associate principal in charge of regular day school activities.
2. Associate principal in charge of senior continuation and adult education activities.
3. Associate principal in charge of all non-instructional activities.

When the building is used to capacity each of the instructional associates will be responsible for at least 5,000 individual students, which is twice the number in any of the comprehensive high schools. The non-instructional associate will occupy a position equivalent to that of a business manager of a concern doing one million dollars worth of business a year.

The duties of the principal for the entire building and the instructional associates for their respective divisions will be:

1. The carrying out of policies that provide physical and educational conditions under which pupil and teacher may work to best advantage.
2. The provision of channels through which the course of study, general data and instructions may be quickly and effectively placed in operation.
3. The provision of channels through which information and conditions in the school may be promptly transmitted to the central offices.
4. The putting into operation standards of achievement.
5. The preparation of general data and reports.

6. Research activities.
7. General publicity.

Vocational Counselors.

Attached to each of the instructional associates are two vocational counselors whose function it will be to assign the incoming pupils to departments and to courses, in cooperation with group heads, according to their desires and abilities, upon the basis of their vocational records in other Detroit schools or upon special investigation in the case of newcomers. The actual mechanics of assigning to specific classes will be done by the program clerks in the non-instruction department.

The counselors will be fully responsible for the vocational and educational direction of all students in the division to which they are attached.

When the school is fully operative it may be necessary to increase their number.

Non-Instructional Associate.

All non-instructional activities for the entire school will be under the direction of the third associate principal. These activities may be classified as follows: 1. Finance. 2. Records. 3. Operation and Maintenance of the building.

1. Finance.

Under this division are the following sub-activities:

a. Preparation of the budget.
b. Development of cost data.
c. Requisitions for supplies and equipment and distribution of the same.
d. Pay-rolls.
e. Receiving clerk.
f. Stock room.
g. Stock record and inventory.
h. Bookstore.
i. Internal accounting.
j. Lunch room.

2. Records.

Under this division are the following activities:

a. Registration, attendance and program records.
b. Attendance teachers.
c. Discipline.
d. Credits.
e. Reports and Statistics.
f. Files and all permanent records.
g. Stenographic.
h. Mimeographic.
i. Information.
j. Telephone operators.

3. Operation and Maintenance.

Direction of the Building Custodian who is responsible for:

a. Operation of Building.
   Engineers (heating and ventilation).
   Elevator operators.
   Janitors (cleanliness).
b. Maintenance of Building.
   1. Electricians.
   2. Plumbers.
   3. Mechanics.
   4. Carpenters.
   5. Laboratory assistants.
   6. Tool men.

(To Be Concluded)

Some Standards by Which to Judge Mechanical Drawing Texts

W. W. Ermeling, Instructor, Junior College, Chicago, Ill.

THE subject of mechanical drawing is taught as a separate study in all grades of school from the seventh and eighth up to and including the sophomore year in college. Textbooks on the subject are available for any of the usual groupings of these grades including grammar, junior high, four-year high, vocational, part-time and evening, college and university.

Beside the usual textbooks, courses formulated by committees of teachers are becoming quite common. In these manuals and textbooks are crystalized the practice and methods of instruction of those whose words are carefully read by new teachers seeking inspiration, or occasionally scoffed at by those whose experience may have led to conclusions differing from those of the authors.

That the standards of work in the subject vary greatly is generally agreed. With hundreds of teachers whose training ranges from a few months' experience in a drafting room to that of heads of drawing departments with years of training and practical experience, no other conclusion is possible.

A resume of some recent expressions of opinion by a number of teachers and supervisors regarding mechanical drawing texts, together with a study by the writer of a number of recent texts, forms the basis of this article. The reports came from widely separated parts of the country and were considered sufficiently representative to give a fair picture of present standards.

The texts examined may be divided into two broad groups: first, those that have for their aim the teaching of mechanical drawing by methods and content similar to those used in teaching engineering drawing in college and university, and second, those textbooks whose authors frankly break away from that idea and aim to provide a course better fitted to the average student.

The books in the first group usually begin with chapters on drawing instruments and their use followed either by a chapter on lettering or one on applied geometry. A chapter on working drawings of typical geometrical solids and small machine parts is commonly placed next, together with a discussion of orthographic projection. A chapter or two on problems of a practical nature, the character of which varies according to the author's interest or past experience, completes the book.

The books which may be classed with the second group, those that aim to provide other than a technical course in drawing, usually contain a collection of problems less limited in scope than that of the first group and often arranged in a rather informal manner. Though the books seem so unlike, the authors of both types profess to have the same ideal in mind, namely that of exemplifying the fundamental principles of mechanical drawing.

How then is one to differentiate between them?

It would seem logical that the first work in any drafting course should be simple, informational regarding methods and principles of drafting, and of such character as to develop proper technique. There should also be provided means for overcoming the difficulties usually met with by teacher and pupil. If the difficulty of the problems is well graded and the beginning plates are designed to cultivate the sense of accomplishment, much that usually hinders progress will be obviated. With the beginning work so planned that a whole plate, or a definite part of it, may be completed in one assignment, students will look forward to each new lesson with an interest never manifested in classes where lettering is followed steadily for a week, or where the first drawing plate requires an understanding of the whole theory of orthographic projection.

Too many teachers expect beginning work of too high a standard. This is particularly likely to be true of college students who, just beginning to teach, do not sense the difference between high school and college work and standards, particularly if the text used is similar to that used in their college drafting courses. New teachers working without intelligent supervision, or those lacking teacher training are also likely to fail thus.

Comparing present-day texts with those of fifteen or twenty years ago, one notes a number of changes. One is that geometrical problems, as drawing projects, are considered less important now than formerly. Such books as Faunce's Mechanical Drawing with its 109 nicely arranged geometrical problems are not now being published. Though the writer does not remember that in any of the newer texts geometrical problems have been entirely omitted, there has been noted a very definite minimizing of their importance in recent years.

As an indication of the changed feeling regarding the whole problem of proper texts for high school mechanical drawing the following quotation from the preface of one text is given: "Sections, intersections and developments are not treated; the place for this is in a descriptive geometry text." Possibly but few wholly agree with the author quoted, but all probably agree that, "a text should meet individual differences of the pupils" and have "illustrations and notes particularly helpful to beginners."

The increased use of pictures in drawing texts and the use by the student of the more or less pictorial methods of representation, such as isometric and cabinet projection, give to many texts an interest that older books on the subject often lacked. With the changes in the manner of presentation of drawing problems we have undoubtedly answered the criticism "that there is too much copying of plates, and not enough initiative is required on the part of the student."

The increasing number of manuals previously referred to is an evidence of the fact that local conditions at times are such as to make it difficult to obtain satisfaction with the usual textbook. Many teachers make their own course of study, passing on to their classes by means of blueprints the information necessary. In this connection, quotations from a number of the letters mentioned earlier may be of interest.

A California teacher writes, "We do not use much text, what we use is mostly blueprints. We draw a great deal from models. We have a good supply of them." A letter from Connecticut reads, "We never have adopted a textbook in this department and do not expect to. A few copies of a publication may be purchased for library and student use." Another writer says, "Personally I do not use a text to any extent, making up a course and revising it every year. Mostly blueprint with blackboard lecture work when occasion warrants it."

In his book "The Selection of Textbooks", C. R. Maxwell points out possible dangers of this method of instruction. He says, "the textbook presents a better basis for organization than could be expected from the teacher." For, he continues, "unless the inexperienced teacher has a complete mastery of the topic from the standpoint of instruction, he fails to appreciate relative values . . . A textbook is an aid in instruction because it is a convenient means for having at hand the necessary data."

That the same text may be variously considered by different instructors is to be looked for; but it is rather startling to read from a teacher in a Texas city, "I feel that it will meet the needs of drawing classes in high schools of our smaller towns but hardly in the larger cities" and then to hear from a large high school in Missouri, "We are to use it in our classes. It is the most teachable of any that has come to my notice." Both comments were upon the same textbook.

Notwithstanding these differences of opinion there are many items upon which it is possible to agree. Differences are often upon details and do not necessarily preclude agreement upon essentials.

One of these essentials is lettering. Despite the fact that many employers harshly criticize the lettering which our students do when set to work in a drafting office, the textbooks examined invariably provide reasonable standards of lettering and show methods of practice, which if followed, should result in good lettering. Nearly all are based on the well known Reinhardt letter which has become standard in so many engineering schools and is so extensively used in drafting offices.

University drawing departments criticize the work of many entering students who have had considerable high school drawing in that they are unable to explain the meaning of the drawings which they made in high school. Granting for the moment this criticism and that of the employer, does the present day textbook of mechanical drawing hold out any hope for us?

It is true that textbooks are not perfect. In a number of them a student must wade through from 20 to 140 pages of general information and discussion before finding what the first plate is to be, or what size of paper or border to use. In a surprisingly large number of instances authors have reverted to the habit of saying, "don't do this" or "never do that." In fact one text takes a page to tabulate nineteen "nevers" while another tries to impart important facts by using a list of twenty "don'ts".

In all too few instances have authors of mechanical drawing texts given evidence that they sense fully that methods of instruction should vary in different types of schools. It is, of course, not denied that the books have different names and that each professes to cover a somewhat different field than the other; nevertheless there is a deadly monotony in many books of drawing. Who has not wondered at the remarkable oneness of thought of those who, after disposing of the technique of drafting, by drawing a number of prisms, cylinders and the like, have agreed so unanimously upon what should follow? The wonderful collection of wooden objects and cast iron machine parts would be the envy of a junk man.

A cast iron object to illustrate every principle and step of the work does not make a course in mechanical drawing. Surely there is more than this to the subject. In fact a noticeable trend in a different direction has begun. Various articles in periodicals like the INDUSTRIAL-ARTS MAGAZINE are pointing the way. Each dissatisfied teacher feeling his way with a blueprint course of study is doing his share too.

The problem of the drafting teacher has often been stated. It is to teach a student how to draw and to understand what he is doing when he draws. It also includes teaching how to read drawings made by others. Mere copying of plates is a minor part of the problem. The understanding must also be developed.

The teacher alone cannot do it. Books alone are not enough. But teachers with a textbook not only will do it, but are doing it now.

A Drawer House—Practical Home Planning and Building

A Project That Will Include All Grades

Mary G. Draser, Teachers College, DeKalb, Ill.

CHILDREN want to work out real live problems. Anything with a concrete idea appeals to them. No one need ask whether a child is interested in his home, for the home is of universal interest and therefore it is of local interest for every locality. Yes, the interest is there, but it needs cultivation. The child's appreciation must be so heightened that he will want to stay at home, especially during the "visiting" age; or shall we call it the "loafing" age? It is during this period that habits are formed. If he becomes intensely interested in the interior and exterior of his home at this age, that interest will continue when he has a home of his home. A man interested in his home seldom fails in portraying good citizenship.

The home building project is not only an ideal training school problem, but it lends itself splendidly to the village and rural school also. It is not only a Manual Training or Industrial Art project, but it combines

FIG. 1. FRONT VIEW OF HOUSE WITH FRONT WALL REMOVED.

with it all the principles of fine arts. This house differs from other houses in that it is a "drawer house." This gives every child an opportunity to furnish a room. He can pull the room out of the house as a drawer, stain the woodwork and floors, paper the walls, weave the rugs, make the furniture and hang the pictures. After

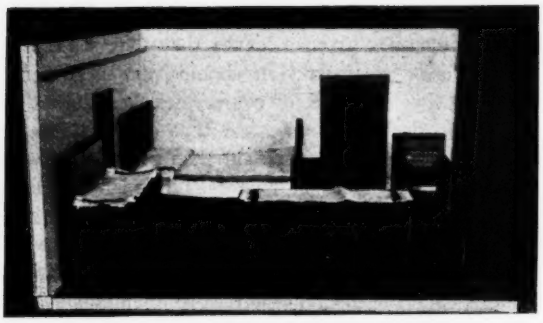


FIG. 2. A BED ROOM—TYPICAL DRAWER.

completely furnishing the rooms, the best ones may be chosen for permanent rooms or children may take turns in having their rooms displayed in the house. The walls being one entire piece of wood, any wall may be unhinged at any time. This affords ready access into the interior.

This problem begins in the eighth grade. The boys and girls may make plans for a convenient, well proportioned home. Probably several parents of this group will be working out a similar problem or will have recently completed a home and in this way the boys and girls may be able to locate advantages and disadvantages in home building. Whenever problems of this sort arise the drawing may cease, while a round-table discussion is carried on until the difficulty is settled. An occasional excursion to a house which is under construction is also very helpful. After the plans are completed a selection may be made by the group. Following the choice, good ideas from other plans may be inserted in the plan chosen and a final plan made from this.

Now that the plans are completed the eighth grade of the industrial art or manual training department may actually build the house. It is very desirable that the house be so constructed that it can be easily taken apart and carried from place to place, yet strong and most durable.

The fifth and sixth grades may have charge of the exterior painting of the house, sewing of curtains, drapes and bedding. It may be well for them to think of repetition of color. A green roof will repeat the color of the landscape. Light-colored walls, gray or ivory, may lend themselves very well to a study of pattern through landscape gardening.

It is now ready for the third and fourth grades. They may stain the woodwork and paper the walls. Arithmetic and industrial arts may be correlated for the time being in these grades and wall papering made a concrete problem.

While the intermediate and upper primary departments are working, the first or second grade may be making the wooden furniture. If you want the furniture more elaborate than is shown in the illustration, more advanced classes may work out this part of the project, but with straight simple pieces of wood cut to size the little folks will be very successful, and more than delighted with their work. While the first grade is working, the second grade may be weaving rugs for the home. The primary children may have the experience of the furniture arrangement, but the eighth grade may have final charge of it. When it is all finished and in place the seventh grade may put their landscape plans into concrete form. They will be most interested in planning this for they will see a direct use of their efforts. Is it not worth while for children to know about planting? Take a walk in any town and see how few shrubs and trees are well placed. The tall trees that should form a beautiful background are generally used as a screen before the house, the bushes are placed promiscuously about the yard or are grouped too solidly around the foundation instead of breaking the

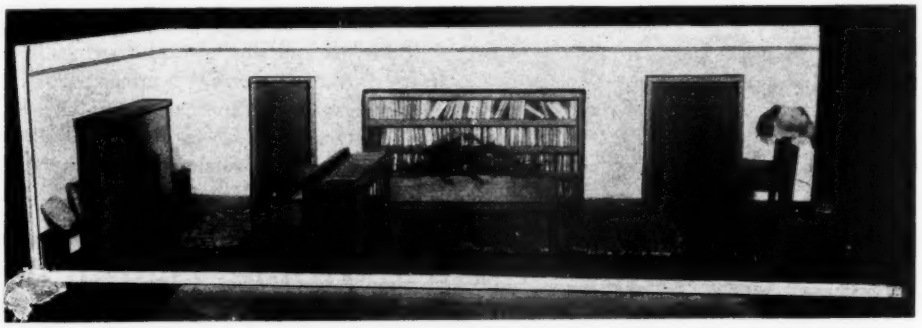


FIG. 3. A TYPICAL DRAWER—THE LIVING ROOM.

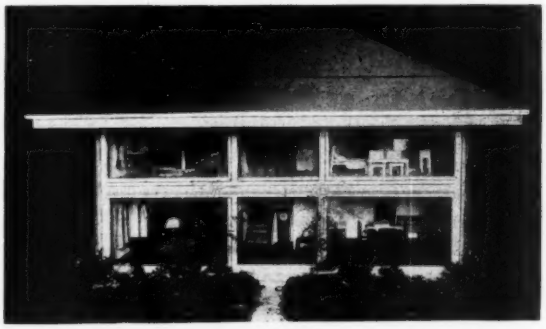


FIG. 4. FRONT VIEW OF THE HOUSE WITH WALL IN PLACE.

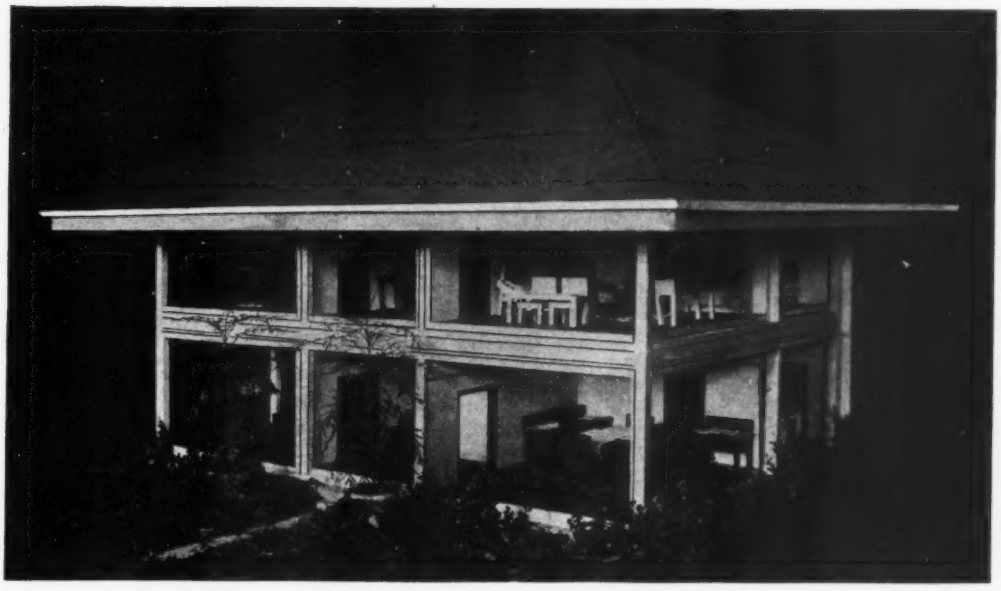


FIG. 5. A PERSPECTIVE OF THE HOUSE SHOWING HOW THE ROOMS FIT INTO THE FRAME WORK.

continuous monotony of dark form about the house. This gives another opportunity of studying light and dark forms in relationship to each other.

The greatest thing to be gained in life is the knowledge of choice. May not such a problem as this lead toward good citizenship, toward the appreciation of an ideal home, and toward showing the youth of today that the life of a nation centers about the home? Will this project not give us more of an opportunity of reaching farther into the future of the child's life than the planning and the placing together of pieces of wood in this materialistic fashion has given us?

The Place of the Vocational School in Accident Prevention

Max S. Henig, M. Fr., Instructor in Accident Frevention, Essex County Vocational School, West Orange, N. J.

Systematic accident-prevention instruction began in the Essex County Vocational School in the fall of 1919 and has grown steadily in intensity and in effectiveness; instruction had previously been given in a desultory way in the several shops that comprise the school and in the academic classroom. The changes made, beginning with the fall of 1919 included (1) the recording in detail of the circumstances involved in every accident that occurred in the school; (2) the use of these records as points of departure for instruction in safe methods of working in the appropriate departments and in the academic classroom; (3) the appointment of accident prevention committees in each department; (4) the gathering of material for a systematic course in accident prevention by the instructor of the academic department, who was also in charge of instruction in accident prevention; (5) the centralizing of the work in the academic department, which, owing to the favorable organization of the school, was best able—by means of school publications, bulletins, records, statistics and the shop safety committees—to stimulate and guide the activities of all departments.

Read before the Eleventh Annual Convention of the National Safety Council.

The work—for the course of instruction emphasized performance rather than understanding alone—grew steadily, under the impress of the experiences it encountered. Ideas were tried, found wanting and abandoned; others opened the way to vistas of tremendous benefits that are certainly attainable by the proper conduct of this work. Concretely, these are the results of the school's short experience in accident-prevention instruction: It has averaged but one lost-time accident each year; it has never suffered a single case of infection; its students are convinced of the practicability of accident prevention; finally, the school itself is enthusiastically enlisted in the accident prevention crusade and is eager to enter further upon its task of equipping its students so that, in the future, they will be influential in spreading the safety movement in industry.

Every Job Has In It a Safety Lesson.

Accident-prevention instruction in vocational schools should best proceed along two lines: (1) In the shop, instruction in safety should accompany each job and, in consequence, would be practicable and appropriate to that particular job; (2) in the academic department, instruction should be informational and inspirational. Between the two there should be the closest in-

terrelation that the organization of the school and the work itself permit. Let us first consider what material might be presented in the school shop.

The shop instructor can supply much of the teaching material from his stock of experiences. He can present to his pupils many examples of the hazards of industry, tell how these hazards operate and what success meets the efforts to control them. He can inform his pupils of the common causes of industrial accidents, of the parts that mechanical safe-guards, equipment, habits and ignorance take in either preventing or promoting them. The instructor should also keep an accurate record of the accidents that occur in his and the other school shops or have access to them if they are compiled by someone else. He will then have on hand plenty of concrete material for this most important phase of his instruction.

Lessons To Be Vital Must Be Felt and Understood.

As a result of records faithfully kept at West Orange over these last three years, an accumulation of examples of the possible kinds of shop accidents has been secured, and these are of great value. This data parallels in a general way, it is true, the information given by the industrial accident records—that fact but enhances its practical value—but it also gives the flavor of intimacy and reality to this instruction that could never be gained by recourse to the statistics of industry alone as an incentive to active accident-prevention endeavor by vocational school students. The value of this tone of immediacy, or warmth, has long been recognized in teaching children and it has also been appreciated and used in driving home the lesson with the men in the shops, to whom it has often been presented, in the form of a bulletin or the photograph of a particularly harrowing accident. The shop instructor, however, has the opportunity of guiding and even controlling each student's first steps in his chosen trade and he best can direct them along the highway of safety. He should take up with each pupil, with every job assigned him, its common and also its possible dangers. He should instruct his charges not only in the proper manipulation of hand tools, but in the proper disposal of the hands themselves as many accidents while using tools arise from the faulty position of the hands. He should, further, instruct his pupils on the benefits of properly caring for these tools. The same instruction, of course, should be given regarding the use and care of all sorts of machinery and equipment. None of these is so innocent but it hides some hazard.

Instructor Must Guide Beginner Even In Simple Work.

I desire in this connection to be emphatic: The instructor must, in order to make his instruction effective, thoroughly analyze every job he presents to his pupils, so that no possible hazard be overlooked. Hand tools, for example, are a prolific cause of accidents not only in industry, but also particularly so in vocational schools. This, to a great extent, is due to the frequency of their use, but this very condition has apparently also given birth to a certain contempt for their ability to inflict injury. The attitude commonly taken is that everyone can use a hammer, saw, chisel and screwdriver. The shop instructor, in consequence, while considering that some direction may be necessary to increase the beginner's skill in manipulating these and kindred tools, gives practically none concerning their dangers.

Our accident records have made me an enthusiastic advocate of the idea that there is a mass of teaching material connected with the workmanlike manipulation and the safe use of hand tools that the shibboleth "Be Careful" does not even insinuate. The boys in our woodworking department, for example, frequently bruise or lacerate the fingers of the hand that grasps the knob of the plane. Our records show that this may be caused in any one of several ways: By improper blocking of the stock upon which the boy is working, by striking a projecting nail left in the bench when a piece of blocking material was torn off, by striking a projecting part of the bench vise, by striking material left upon the bench and, finally, by improperly grasping the knob itself. This instance serves, I hope, to bring out the point that, to a large extent, the shop instructor's success in preventing accidents in his department will depend upon his ability to discover by careful analysis the immediate causes of accidents, and then, by instructions, warnings and constant supervision, guard against them.

An Accident Is a Reflection Upon the Instructor.

The following suggestion will, I believe, be considered harsh and radical, but the shop instructor should recognize as a most severe condemnation of his ability as a teacher the fact that an accident has occurred to one of his pupils. His is the task of producing boys equipped with a system of safe working habits that will protect them during their careers as mechanics. A new generation of workers, highly skilled and highly efficient in the sense of their comparative freedom from injury, would arise under such responsible instruction.

The academic department proceeds with its share of the responsible task of teaching accident prevention with an entirely different mass of material. Its undertaking is that of presenting accident prevention as a subject, which is an integral part of the curriculum. So presented it has that great advantage of organization that such a method of presentation always permits. The material to be organized must be gathered from a wide range of sources and so much is left to the instructor's facilities for gathering it, as well as to his judgment as to what available material is worth while.

We have gone to the following sources for material: The National Safety Council's Safe Practices pamphlets, The National Safety News, the Safety Institute of America's Bulletins, The Traveler's Standard, the publications of other insurance companies such as the Aetna, and, finally, to standard texts, such as Tolman's and Price's. A suggested course of instruction consists of such topics as (1) history of the safety movement; (2) the need of it; (3) its advantages to employers, employees, and the Nation; (4) the safe plant, including such subtopics as layout of plant and equipment, fire protection, lighting, ventilation, heating and so on; (5)

equipment hazards, such as machinery, elevators and ladders; (6) relation between hygiene and safety and (7) fatigue and safety; (8) accident-prevention methods; (9) prevention of infections; (10) first aid; (11) workmen's compensation. These topics are general. It is obvious that the material and its organization must vary not only as between different schools but also in the same school with boys from different departments.

Compensation Found In Student Understanding.

The material itself is rich in quantity and has, besides, a tremendous appeal. Every topic possesses the qualities of nearness and warmth, for they can all be referred to conditions existing in the school. Such a topic as lighting and its relation to accidents need create no purely academic discussion; it is too closely related to the various school shops for that. Every accident that occurs becomes the "jumping-off-place" for a live lesson in safety methods and the daily papers offer plenty of additional material. The instructor in the academic department will find a man's-size job on his hands, it is true, once he begins the undertaking of collecting and selecting his material and organizing it as a course of instruction, but his students' increased understanding of the subject and devotion to the tenets of accident prevention will amply compensate him.

Accident-prevention instruction is unique in that some of the devices that should be used to get the student to apply his knowledge are in themselves added instruction. This applies particularly to such devices as accident-prevention committees, first-aid treatment and the study of school conditions that are used for vitalizing the instruction that is given in the academic department. It has been pointed out that instruction in accident prevention in the shop is an elemental part of the teaching process for each and every job. The instructors have the opportunity, and should avail themselves of it, of placing safety on the same level as good workmanship—it really is more than an opportunity, it is a responsibility.

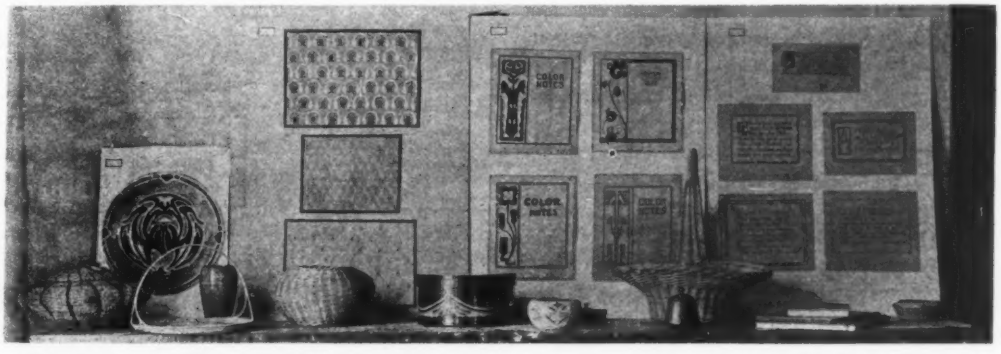
Boys Get Taste of Actual Work.

The instructor in academic subjects should possess the altogether proper ambition of making his instruction function immediately in his students' affairs also and to a high degree. He can do this in several ways. (1) By encouraging the drawing of parallels between conditions, both actual and ideal, in industry and in the school; (2) by giving instruction in first aid; (3) by conducting accident-prevention campaigns; (4) by organizing accident-prevention committees. This last device gives the student mechanic ample opportunity of applying every bit of information he has acquired. He begins by making sure of himself as a safe worker; he keeps an eye upon his companions, particularly the green boy, and is ready to warn against the possible injurious effects of careless or improper practices; he makes our detailed reports of such accidents as do occur and, upon consultation with his instructor, advises how similar occurrences can be avoided; he administers elementary first aid; he follows up cases being treated until they are discharged as cured; he suggests means of improving school and shop conditions—in every way within his power he devotes himself to the task of spreading by deeds the gospel of accident prevention.

These activities have substantial benefits; they instruct the boys in concrete manner in the value and necessity of cooperation in the campaign against accidents and at the same time reveal the duties, the responsibilities and the rights in this movement of both employer and worker. The opportunity of using the above devices, that are in themselves instruction in the methods of industry in campaigning against accidents, is so rich in possibilities that it would be a misfortune to overlook it.

Broadcasting Message of Industrial Safety.

The primary function of the vocational school is that of producing skilled workers, but what advantage accrues to the community if these boys, upon whom have been lavished expert instruction, a substantial amount of money and two or three years of time, pass out into industry ignorant or out of sympathy with this movement that promises most to himself and his family, to his employer, to the entire Nation? The vocational school can, on the other hand, by giving accident-prevention instruction its proper place in the curriculum, become a most important station for broadcasting the message of industrial safety. Such instruction, given sympathetically, enthusiastically and effectively, is the most definite assurance of a decided reduction in industrial accidents that appears at this moment. It practically guarantees to the graduates of these schools careers unmarred by the hazards of their trades.



INDUSTRIAL ART WORK, CHRISTIAN UNIVERSITY, TEXAS. Mrs. Dura Brokaw Cockrell, Director of Art Department.

Cement Work as a Therapeutic Occupation for Men

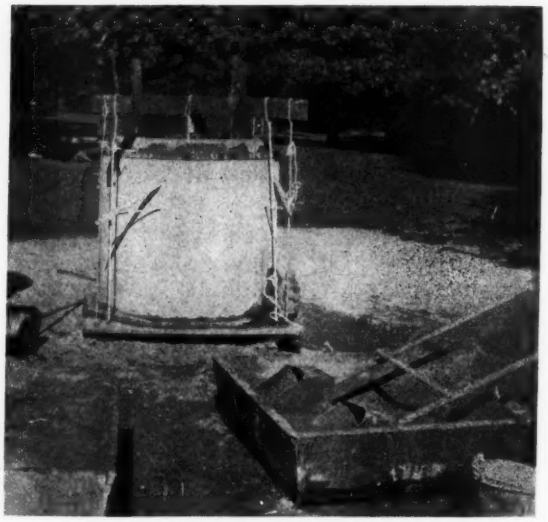
Louis J. Haas, Director of Therapeutic Occupations, Bloomingdale Hospital, White Plains, New York

PLATE 5 shows the way a very definite local need was met. The inspiration for this problem was the fact that ten large palms had outgrown the largest wooden tubs to be found on the market. So it was decided to attempt to make a mold in which a cement tub could be cast in one pour. This tub, when finished, had an inside diameter of three feet and an inside depth of three feet. The walls were 2″ thick, and the bottom 2½″, while at the top a lip projected beyond the wall 2″, having a face of 2½″. This tub weighed when completed 1050 pounds.

First, a ring composed of 8 segments held together with cleats was made of 1″ wood. Five of these segments were identical in shape, but the other three were so proportioned, that one of them became a key block (see "aa" on plan of mold, Plate 5).

The ring and disk was the foundation for the core walls, and also supported the upward thrust upon the bottom, which was a disc of No. 20 gauge galv. iron, 35¼″ in diameter. This disk was held in place upon the ring with as few carpet tacks as it was possible to use, so that when the wooden supporting disc and cleats were removed the key segment could be easily removed, and afterwards the rest of the segments of the ring, and finally the metal disc, being ¾″ smaller than the inside diameter of the tub.

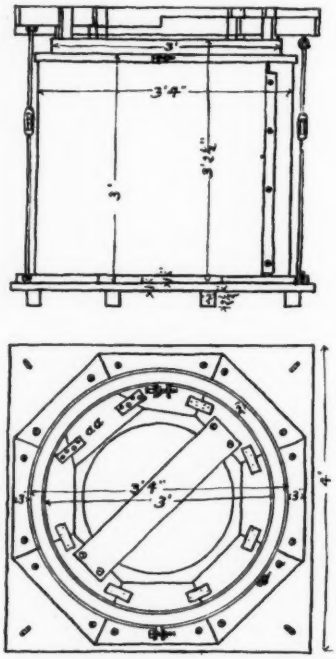
Three rings of 1″x¼″ iron were shaped with inturning members which engaged expanding bolts (see drawing "b" Plate 5). The core walls were built

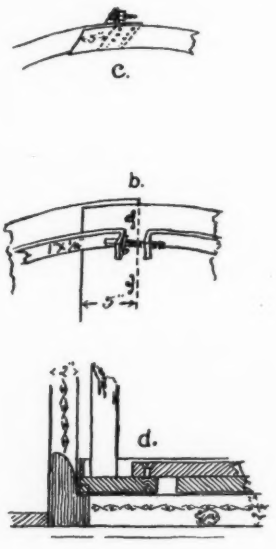


5A. THE TUB UNDER CONSTRUCTION ON THE MOLD PLATFORM.

around these three expanding rings, and the segmented ring of the bottom, of a piece of No. 18 gauge galv. iron jointed, and tied with wire, passed through two holes in each part of the lap every 6″ and tied on the inside. This wall could be expanded by the action of the rings placed top and bottom and middle to just sufficient diameter to allow the bottom to be forced into place.

To insure the easy removal of the walls of the core from the cast tub, the bottom was left to extend beyond the wall's edge ⅛″. To hold the bottom in this position, the tightly fitting expansion ring was driven down





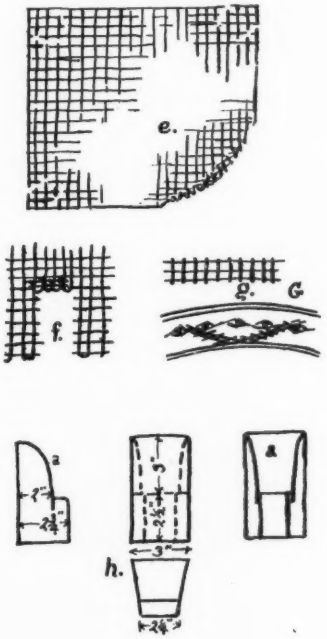
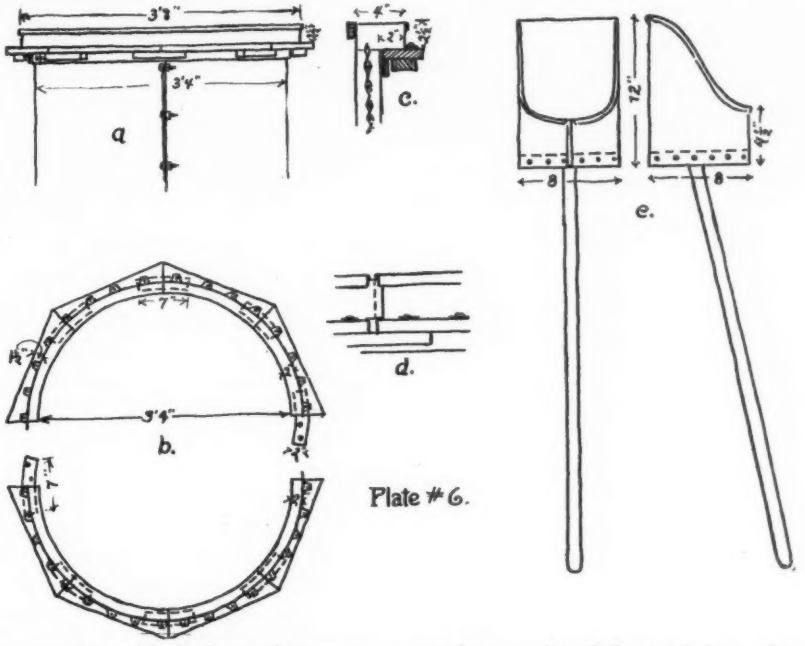


Plate #5.

tight against the segmented ring of the bottom and then about eight carpet tacks were driven through holes in the core walls into the segments of the wooden rings. This completed the assembling of the core. The form of lapped joint used on the core walls under the outward pressure of the rings and the inward pressure of the cement, was tight enough to be leak-proof (see drawing "b" Plate 5).

Next the mold platform was constructed of one inch planks. This was made 4 ft. square and heavily braced with 4 battens 2″x2½″. After the mold platform had been faced off, it was covered with a sheet of galvanized iron. A retaining ring of eight segments was made and



fastened into place upon the mold platform with screws. The inside of this retaining ring was a circle 3′ 4″ in diameter. The retaining wall was a piece of three foot wide No. 18 gauge, galvanized iron cut long enough so that when one end was bent up to form an outward extending flange one inch wide, the other end could underlap it 5″, and make a cylinder which would fit tight within the retaining ring of the mold platform. To the end which underlapped the flanged end of the retaining wall was riveted a right angled piece of galvanized iron.

The flanges were held firmly together, by a number of short stove bolts passing through two rods, placed on either side. The retaining wall was forced into place within the retaining ring of the mold platform. The upper part of this retaining wall was held into shape by a retaining ring of 1″x¼″ iron, whose outturning flanges held a contracting bolt used to reduce it until it fits snugly upon the retaining wall. The form of lap joint and flange used in the retaining wall gave a tight joint which became more leak-proof under the pressure of the cement. To prevent the retaining wall being floated by the pressure of cement it was tied down with wires passing over the iron retaining ring and fastened to screw eyes.

The four core supports and adjusters shown in drawings "d" and "h" (Plate 5) were made of maple, and the surface "a" faced with galvanized iron. These served a three-fold purpose. First, when the assembled core was let carefully down upon them, it rested upon a shelf-like projection which held it just 2½″ above the platform, the space required for the thickness of the bottom of the cement pot. Second, the core adjusted and centralized itself between these four blocks, the space between it and the retaining wall, measured everywhere just 2″. Third, the space left by the four blocks when removed from the pot by a tap with a mallet upon a section of the surface "a" which can be seen from inside the pot when core has been removed, formed a very good type of drainage for the tub. When the mold had been assembled and the core set in place upon its supports, a cross of two pieces of wood 3″x1″ was made. To the arms of this cross were fastened four pieces of wood 2″x1″ of sufficient length, that when the guy or stay bolts were adjusted the pressure exerted to counter- upon the segmented ring of the bottom.

Finally, the mold for the lip of the tub was constructed, upon a segment ring of wood as shown in drawing "a" and "b" Plate 6. This mold was made to be assembled in two parts and was not put in place until the mold was filled to the height of the retaining walls. The retaining ring was then carefully driven down ¾″ below the edge of the wall, and the lip mold placed upon the edge of the ring, and locked into place with 4 screws passing through the overlapping cleats (see drawing "c" and "d" Plate 6).

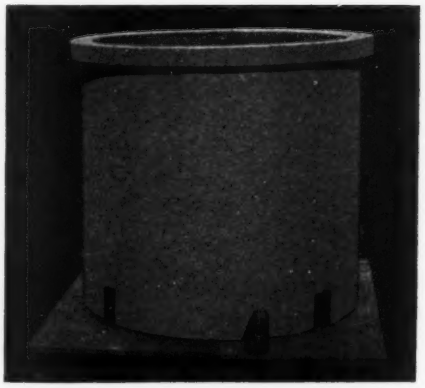
No further explanation of the construction of the scoops need be given than is shown by the drawing "e" Plate 6. After the mold was constructed and assembled, a reinforcing of galvanized ½" or ¾" mesh of No. 20 gauge wire three feet wide was made as follows: A 3' 2" square of the wire mesh was cut. The corners of the square were bent up on the line of a 3' 2" circle (see drawing "e" Plate 5. To facilitate the bending up of the corners they were split into 3 sections in as far as the circle on radiating lines. The reinforcing for the wall was next cut, the full width of the roll of mesh, and long enough to allow the ends to lap about five inches. This piece of wire mesh was fastened about the piece just prepared for the bottom, being tied every ten or twelve inches, so that the bottom was supported just ¾" above the lower edge of the wall of reinforcing mesh.

The lapping joint was then tied so that the top of the wall would have the same circumference as the bottom. Then the openings at the 4 quarters necessary to clear the supporting blocks were cut. About 2" of section cut out of the wall reinforcement mesh was just rolled out so as to control the one inch clearance that must be retained between reinforcement mesh and retaining wall of mold (see drawing "f" Plate 5). The same thing was done with the portion of mesh which was cut out of the bottom reinforcement mesh, and then everything was ready for the pour.

The mold was completely assembled and tied to the platform as described above and leveled. Next, about four stones approximately ¾" in diameter were placed upon the bottom of the mold, about twelve inches from the center to help keep the bottom reinforcing from sagging; and then the reinforcing was set in place, resting upon the bottom edge of its own wall, and the four stones (see drawing "d" Plate 5). The four core support blocks were then set in place in the openings in the reinforcing, and the assembled core carefully lowered into place until it rested upon the shelves of the supports and was held firmly centered by the wedge-like upper parts of these blocks. Then the cross and upright stays were set in place and fastened securely with the guy or stay bolts (see elevation on section, drawing "d" Plate 5).

Finally the upper edge of the wall reinforcing was adjusted so as to be one inch from the core, all around. This was done by placing between it and the core wall a number of small spacers which were but strips of the wire mesh from two to four meshes wide and about five inches long, bent in the center, and held in place by the action of the loose ends of the wire passing through, and engaging the wire of the mesh composing the wall reinforcing (see drawing "g", Plate 5). The mold then was ready to fill.

It took a mixture composed of 14½ pails (ten quarts each) of clean sand and 7¼ pails cement, to which was added six pails of water, to bring it to the proper fluid consistency. Two troughs the size of those shown in Plate 13 were used to hold the mixture. The



6A. The COMPLETED TUB.

full quantity of sand and cement was thoroughly mixed in the troughs and the water added to the mixture in one of them and the filling of the mold was started, employing several men with scoops (see drawing "e," Plate 6).

As the cement mounted in the mold, the retaining wall was tapped with a light flat board to help settle the cement by vibration into all parts of the mold. As soon as the tub mold was completely filled, the lip mold was fastened in place, and the pouring continued until this was filled. This mold was finally vibrated to insure even settling of the cement. The mold was watched, and filled up, until all settling was over, and then the top face of the lip of the tub was finished with the trowel.

During the casting continual watch was kept for leaks which did not occur about the bottom of the core. A handful of sand thrown into the leak was the most effectual way of stopping it. In fact, a certain amount of sand was thrown about the bottom, inside the core mold, to safeguard against leakage which might appear as the head of cement increased the pressure. A seal of sand was also placed against the base of the retaining wall of this mold, as a prevention against leakage. The pouring must be, and was completed in one day.

On the third morning after the tub was poured, the mold was carefully removed and cleaned with a brush and a good stiff broom, before being reassembled. The four support blocks were removed from the cement by tapping on them with a wooden drift and mallet, after which the thin layer of cement blocking the upper parts of the holes left by these supports was carefully removed, leaving a clear drainage opening of sufficient size. About the fourth morning the pot was removed from the mold platform and allowed to cure at least two weeks before it was moved to the greenhouse. Each day the garden-hose was used on it, to thoroughly wet it down, as this facilitates the curing of the cement. As soon as the tub had been moved from the platform, which could even be as early as the end of the third day after starting to make the pour, the clean mold was reassembled and prepared for the next cast.

(To be Continued)

Projects for Halloween

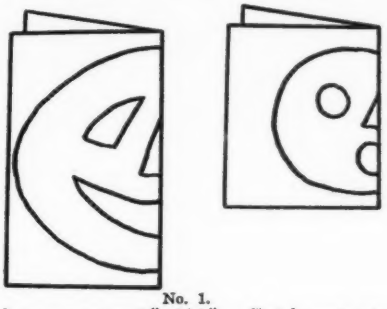
S E. E. Hammond

PROBLEM 1.

Material:

1 pc. gray paper, 8¼″x11½″.
1 pc. black paper, 9″x12″.
1 pc. black paper, ½″x10½″.
1 pc. black paper, 2″x4″.
1 pc. orange paper, 2½″x5″.
1 pc. brown paper, 2½″x5″.
1 pc. bright green paper, 2½″x5″.

Cut brown paper, 2½″x5″ into three pieces 2″x 2½″, 1½″x2½″, and 1½″x2½″ respectively. Repeat with orange paper, 2½″x5″. Fold orange paper 2″x 2½″, on short diameter. Cut as shown in Fig. 1.



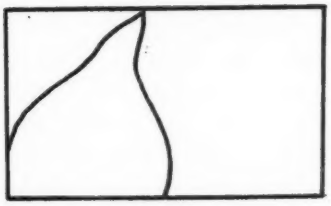
No. 1.

Paste on brown paper, 2″x2½″. Cut brown paper close to edge of orange paper. Place under weight. Repeat with one orange and brown paper, 1½″x2½″, cutting as in Fig. 1A. Repeat with other orange and brown paper, 1½″x2½″, cutting as in Fig. 1B. Cut bright green

No. 1A.

No. 1B.

No. 1D.



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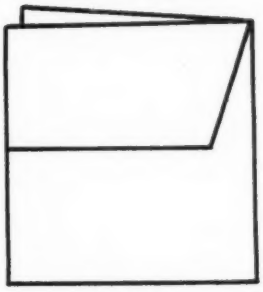

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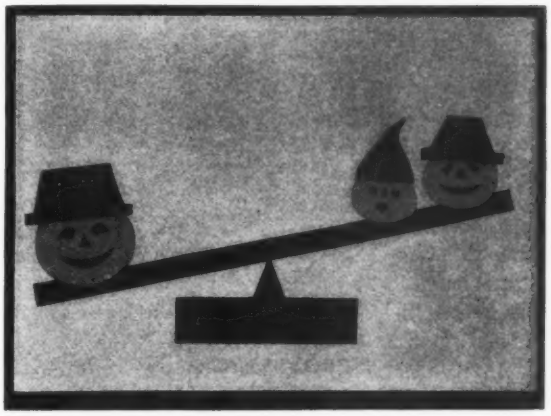


No. 1.

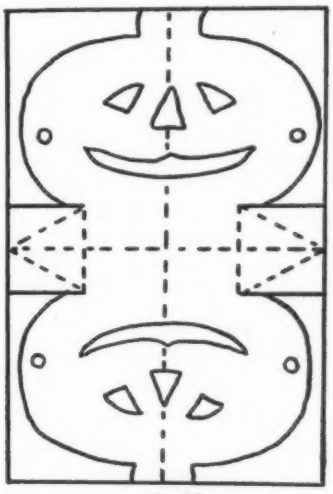
paper, 2½″x5″, into three pieces 1½″x2½″, 1½″x2½″, and 2″x2½″ respectively. Fold green paper, 1½″x2½″, on short diameter. Cut hat. Fig. 1C. Fold green paper 2″x2½″ on long diameter. Cut hat. Fig. 1D. Cut cap from green paper, 1½″x2½″, Fig. 1E. Fold black paper, 2″x4″, on short diameter. Cut base of teeter. Fig. 1F. Assemble parts on gray paper, 8¼″x 11½″. See picture. Lower edge of base of teeter is about one inch from lower edge of gray paper. Mount gray paper on black paper, 9″x12″. Lower margin of black paper is about one-half inch. Place under weight.

PROBLEM 2.

Material:

1 pc. orange paper, 6″x9″.
2 pcs. dark blue raffia or cord, 5″.

Fold orange paper, 6″x9″, on short diameter. Keep folded, fold over folded 6″ edge to form oblong about 1″x6″. Unfold last fold. Paper is now 4½″x6″. Fold on short diameter. At X, Fig. 2, cut in on fold about 1¾″. Cut pumpkin, mouth, nose, and eye. Open paper



No. 2A.

No. 2.

No. 2.

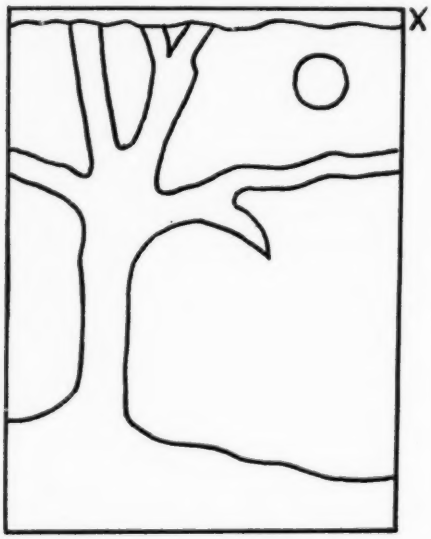
flat, fold oblong 1 as shown in Fig 2A. Repeat with oblong 2. Fold these triangles in. Punch four holes and tie pumpkins at points marked 0 and basket is ready to fill with nuts. If lantern is desired place small candle at center of base.

PROBLEM 3.

Material:

1 pc. black paper, 9″x12″.
2 pcs. dark blue paper, 9″x12″.
2 pcs. orange tissue paper, 9″x12″.
1 pc. orange cord, 15″.

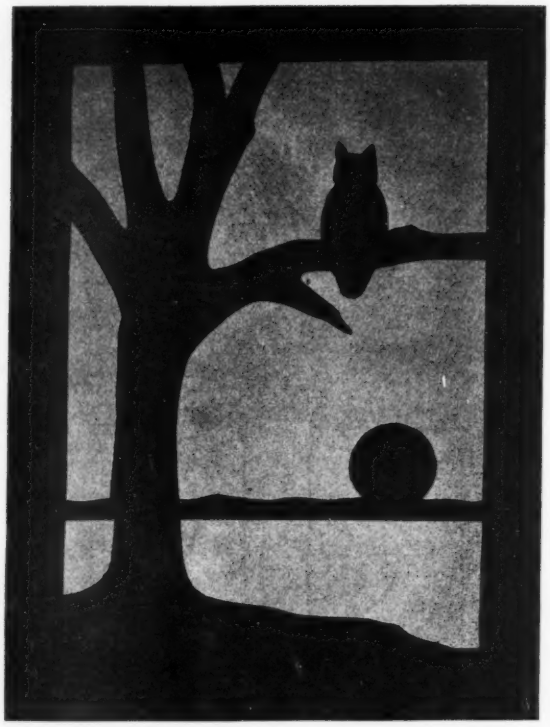
Cut narrow strip for distance in picture from 9″ edge of black paper, 9″x12″. See X, Fig. 3. Cut tree



No. 3.

No. 3A.

and foreground from remaining black paper, Fig. 3. Cut circle for moon from piece of black paper. From piece of black paper cut paper 1½″x3″. Fold this paper on long diameter. Cut owl, Fig. 3A. On dark blue paper, 9″x12″, draw line 1¼″ from and parallel to one 9″ edge. Draw line 1″ from line 1″ from and parallel to one 12″ edge. Repeat at opposite 12″ edge. You now have oblong 7″x12″. Cut out 7″x12″ oblong being careful to cut exactly on lines to insure straight and even edges. You now have a frame 9″x12″ and 1″ wide at top and sides with lower part 1¼″ wide. From second dark blue paper, 9″x12″, cut second blue frame like first frame. Paste one blue frame on one piece of orange tissue paper, 9″x12″. Repeat with second blue frame and other orange tissue paper. Assemble and paste lightly black paper cuttings of distance, moon, tree,



No. 3.

and owl on one orange tissue paper on opposite side from blue frame. Paste tissue papers together with frames on outside. Apply paste only to width of frames. Place under weight to dry. When dry punch hole in middle of top frame, tie in cord and hang in window.

PROBLEM 4.

Material:

1 pc. manilla paper, 5″x5½″.
1 pc. green paper, 4¾″x9″.
1 pc. orange paper, ¼″x4¼″.
1 pc. orange paper, 3½″x4¼″.
1 pc. black paper, 2″x4″.

Fold orange paper, 3½″x5″ on short diameter. Paper is now 2½″x3½″. Keep folded, fold on short diameter. Cut pumpkin. Fig. 4. The vertical cut at lower edge is ½″. Fold black paper, 2″x4″, on short diameter, trace shape of pumpkin, cut irregular shape for hair. Fig. 4A. Place black paper inside cut pumpkin, paste edges of pumpkin to black paper. Place under weight. Fold green paper, 4¾″x9″, on short diameter. Paper is now 4½″x4¾″. Keep folded, fold on short diameter. Cut dress. Fig. 4B. Mark point A ½″ from folded edge. Repeat on opposite side of paper. Unfold dress using pinpoint cut fold between two points. On manilla paper, 5″x5½″, draw line ½″ from and parallel to one 5″ edge. Using one end of this line as center draw arc using 4¾″ radius. Fig. 4C. Draw line A B. Cut out sector. Paste sector lapping edge A C to line A X. When thoroughly dry cut ½″ slit through apex of cone. Fig. 4D. Slip lower part of pumpkin head through 1″ cut at neck of dress. Lay one half of dress up over pumpkin head, paste orange paper, ¼″x4¼″, on lower part of pumpkin head being careful extensions are same length. Turn down dress, slip lower part of pumpkin head in vertical slit of cone.

FIG. 4B.

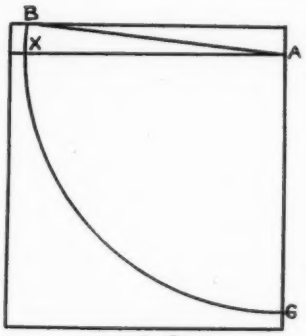


FIG. 4D.

FIG. 4C.

FIG. 4.

FIG. 4A.

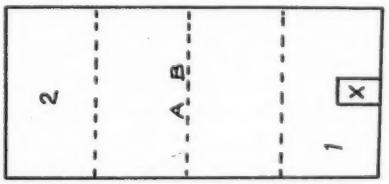
Paste dress together at waist line and lower part of skirt. Trim skirt even with base of cone.

PROBLEM 5.

Material:

1 pc. brown paper, 2½″x5″.
1 pc. orange paper, 2½″x2½″.
1 pc. black paper, 2″x4½″.
1 pc. tagboard, ¼″x4½″.

Fold orange paper, 2½″x2½″, on one diameter. Cut pumpkin shape and features. Fig. 5. Fold brown paper, 2½″x5″, on short diameter. Paste cut out orange paper on folded brown paper placing top of paper about ¼″ from fold of brown paper. Apply paste only to edge of orange paper to keep from curling. Cut out brown paper cutting stem of pumpkin and having a brown margin around head about ⅛″ wide. See picture. Place under weight. Color tagboard, ¼″x4½″, using black crayon. Color sides and edges. Fold over one end about ½″. Paste opposite end of tagboard inside brown pumpkin with about 2¾″ extending below. Paste edges of brown pumpkin. Place under weight. Fold black paper, 2″x4½″. Fig. 5A. With pin cut slit A B in middle fold. Slit should be ¼″ same as width of tagboard. Slip tagboard through slit, paste ½″ end in position marked X of oblong 1, Fig. 5A. Paste oblong



No. 5A.

No. 4.

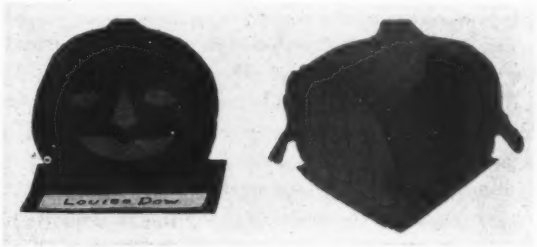
2 to oblong 1. This can be used as place card by printing name with white pencil or white ink.

PROBLEM 6.

Material:

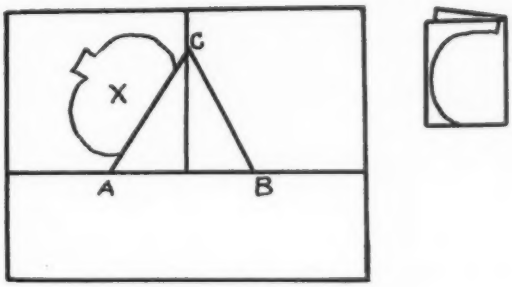
1 pc. white paper, 4½″x6″.
1 pc. white paper, 1¾″x2½″.
1 pc. orange paper, 4½″x6″.
3 pcs. black cord or raffia, 4″.

On white paper, 4½″x6″, draw line 1¾″ from and parallel to one 6″ edge. Mark middle point of this line. Draw line from this point perpendicular to this 6″ line.



No. 5.

No. 6.



No. 6A.

Fig. 6. Mark point A 1¼″ from middle point. Repeat for point B. From point A draw 2½″ line to perpendicular at point C. Draw line from B to C. Fold white paper, 1¾″x2½″, on short diameter. Cut pumpkin shape. Fig. 6A. Begin cutting pumpkin about ½″ from corner of lower edge. Place pumpkin on white paper, 4½″x6″, in position as at X. Fig. 6a.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

INDUSTRIAL ARTS AND VOCATIONAL GUIDANCE.

In his interesting comments on vocational guidance and training, I. David Cohen, lecturer on vocational guidance in the College of the City of New York, comes to some pertinent conclusions. His most general conclusions are that "maladjustment of individuals to their occupations is responsible for most of our social and political evils, and success in the work of life is the most necessary element in the life of every individual.

Mr. Cohen's questions, "Does the employment manager know his business? Can he analyze the qualifications of applicants?" may both be answered in the negative. In defense of the employment manager and the vocational adviser, we surmise that they may never know their business to the point of great success and complete satisfaction. How can one individual presume to judge the capabilities and the consequent possibilities of other individuals with assurance? The only test of ability is to be found in the results of work done. The possibilities of the worker depend not alone on skill but on the application of that skill to a particular problem which is acceptable and necessary in the world.

No speculation is so speculative as that upon the possibilities of accomplishment of our American youth. The immediate way in which they may be helped is by informing them of conditions and offering them opportunity for training to meet or change those conditions. This is the process of education and is the work of the schools. In so far as industrial conditions apply, industrial education applies to the solution of this problem. We are partial to the term industrial arts because that word "arts" conveys an idea of individual accomplishment in industry, and we are convinced that in addition to the information and skill which may be school taught, there is the great possibility of individual choice, application, and accomplishment. The vocational adviser has our profound interest and sympathy and we hope sincerely that he may be gifted of the gods in his difficult task.

THE EDISON QUESTIONNAIRE.

If Mr. Edison has a sufficient sense of humor to see the joke, he is probably having the time of his life over the tremendous agitation caused by his test questions, many of which he probably looked up in an encyclopedia or the World's Almanac before he propounded them. Papers are filled with the commotion. Even an editorial writer in our esteemed namesake of Peoria gives Mr. Edison a page or so of publicity.

The trouble with genius is that it wants to judge everybody else by its own standards. If a genius is a mathematical prodigy, he immediately sets up a mathematical formula for other people. If he happens to be a statistical genius like Roger Babson, he forthwith produces his statistical yardstick and begins to "tell the world" what's the matter with education. If he is an all round wizard in physics, metaphysics, etc., he feels that absolutely irresistible, inward urge to ask people how they play poker, what grape nuts is made of, and how to do business with the husband of a jealous wife.

We confess to a considerable density of ignorance concerning some of these matters. We'd be rather ashamed to publish our answers to an alarming number of Edison's questions. We prefer to keep secret the exact percentage of the questions we are dead sure of answering correctly. A man on the street was asked one of Edison's questions, "Where is Alhambra?" The reply was, "Don't know; ain't seed Al *today.*"

The fact is that we thought the day of mesmerism, hocus pocus, sleight of hand, and make-believe had about disappeared from the world of education and industry, as it has from the field of medicine, disease, and healing. The time was when a buckeye in one's pocket kept away "cramps," when a silk thread around the neck prevented croup; and when the wart could be removed by rubbing it with a grain of corn and then feeding the corn to a chicken. These superstitions have faded away in the sunlight of information, but similar ones seem to keep bobbing up in other realms.

For somebody's assistance now, a few little test questions absolutely determine one's fitness for the position, especially if the questions have no relation whatever to the duties of such position. We can imagine duties and situations in which the answer to such a question as "What state grows the most hops?" might be regarded as extremely valuable. Or it is conceivable that a questionnaire maker might extract some comfort out of knowing "where we get the most of our asbestos." It is further more conceivable that a man might answer all of Mr. Edison's questions and yet be unfit for almost any and every kind of a job. Indeed we are disposed to think that such a feat would be rather convincing evidence of unfitness.

But, after all, if Mr. Edison wants to select his assistants by a freakish questionnaire method, we shall interpose no objections; so let it go at that.

FOR A GREATER SELF-RELIANCE.

Not many greater things could be done for young people than to give them the power, the disposition, and the opportunity to furnish a part of their own entertainment and amusement. One of the curses of the present age is that young people expect to find satisfaction and enjoyment *outside of themselves.* They must *go;* things must *move;* experiences must be *exciting and away from home.*

People must learn that, after all, happiness is *within;* that enjoyment may come of worthy thought; that satisfaction may arise from the consciousness of service well done.

Young people must be taught that self-reliance in matters of satisfaction and entertainment is desirable and necessary in the same manner, if not in the same degree, as is self-reliance in matters of finance, position, etc. Not that we would have every young man a recluse; but there are vital times when one must be able to live with *himself;* when satisfaction and happiness will come, if they come at all, by decisions or struggles in the quiet of one's own heart.

THE HEAD-MASTER.

There is assurance of ability and success where a teacher of advanced position has come up "through the ranks." "Up through the ranks implies experience that will assure understanding of the details of each kind and grade of work carried on.

Many teachers who are placed directly from college graduation, into positions which give them authority over teachers of experience, are found wanting in the consideration of method, time, and equipment required to do the work in hand. They have been taught generalities of educational procedure with little of actual teaching. They may have a comprehensive view of the educational situation but are obliged to leave details to those who have experienced them.

The director of a department of industrial education in one of our colleges stated recently that he saw little hope for developing teachers of the industrial arts in the colleges, so long as the various schools offering two-year courses could supply such teachers of accepted training but that supervisors of industrial art teaching should be college trained. It might be added that they should be college trained *in addition to* that training which is given in the two-year teacher-training course. At present few supervisors are so trained. The college industrial-art courses are frequently recruited from other college courses than education. Students of other professions often discover in the middle of their four-year course that they may find employment in teaching more easily than in other fields, and the change to the college or school of education results. So they come up from graduation to a prospective job with little or no teaching experience. The college diploma has more weight in the appointment of teachers than in appointment to other occupations. College training has become a common requirement for teachers in the high schools.

Experienced teachers of college training are scarce. So college trained but inexperienced teachers are appointed to positions of supervision over experienced teachers who are not college trained. The results are frequently not harmonious or successful.

The solution lies in more practice teaching and actual school experience for the college degree, and a logical and economical adjustment between the two-year teacher-training course and the four-year college course.

The ideal "head-master" of our American schools does not differ much from that of the English schools, as quoted from Ian Hay in his description of the head-master of today:

"He is essentially a man of business. A clear brain and a sense of proportion enable him to devise schemes of education in which the old idealism and the new materialism are judiciously blinded. He knows how to draw up a school time-table making provision, hour by hour, day by day, for the teaching of a very large number of subjects by a limited number of men to some hundreds of boys all at different stages of progress, in such a way that no boy shall be left idle for a single hour, and no teacher be called upon to be in two places at once. He understands school finance and educational politics. He combines the art of being able to rule upon his own initiative for months at a time, and yet render a satisfactory account of his stewardship to an inquisitive governing body which meets twice a year. He is an imposing figurehead, and if he is, or has been, an athlete, so much the easier for him in his dealings with the boys."

THE GOOD TEACHER.

A successful school system, or year cannot be built upon anything but *good teaching.* Fine buildings are desirable. Elegant furnishings are alright, if they can be afforded. Elaborate equipments bring ease, satisfaction, and sometimes efficiency. But unless there are skilful teachers, the elaborate and expensive facilities are largely wasted and failure is written large over the whole enterprise. *School is a place for instruction and guidance.*

It is not teaching simply to lecture to some immature students. That is only one phase of the process. It is not enough to be merely a skilled manipulator of tools and materials, although this is highly desirable in a teacher of mechanical work. It is not enough to have a strong and attractive personality, although this is a vital factor in teaching. Good intentions alone will not suffice. Great knowledge is highly to be desired, although some really great teachers have not been profound scholars.

The really good teacher combines in some degree all the characteristics just mentioned. The highly superior teacher by the force of his personality, his knowledge, his skill, his methods, and his enthusiasm, *leads* the students unerringly into the very heart of the subject in hand. He secures willing and gladsome obedience. *He does not drive. He does not scold.* He gets an immediate and whole-hearted response to whatever he proposes. He is an inspiration, not a task master. He has a sympathetic understanding of the hopes and ambitions as well as the obstacles and difficulties that accelerate or impede the progress of the boys and girls under his charge. He has the rare faculty of making students happy in their work. Unhappy classes seldom learn.

It should be the ambition of every teacher, especially of the beginner, to become an artist at teaching.

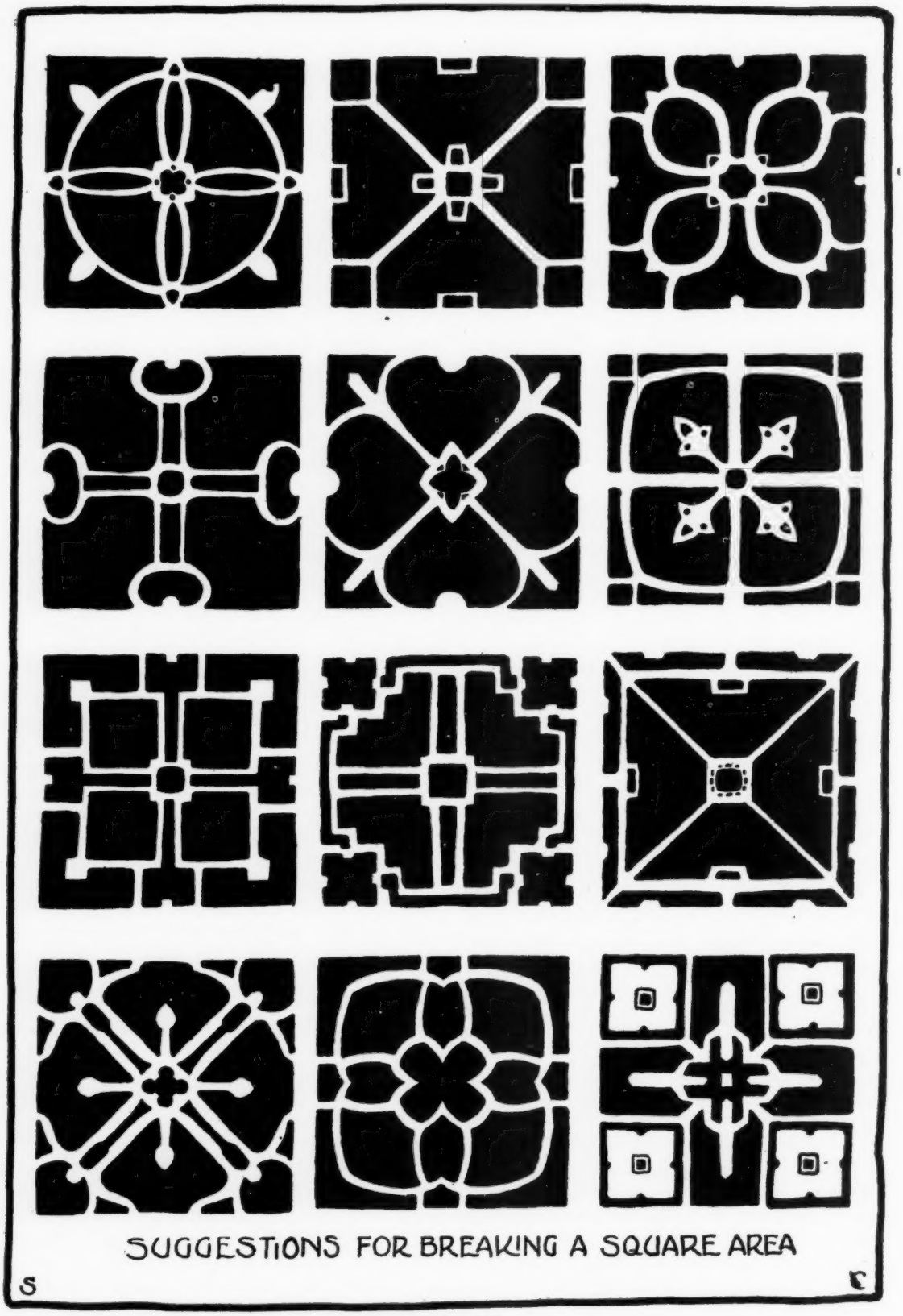


PLATE IX

THIS IS THE NINTH OF A SERIES OF TWELVE PLATES BY MISS SARAH COHOON, SPRINGFIELD, MASS.

Teaching the Miter Joint in a Vocational School

Charles A. King, State Normal School, Plymouth, New Hampshire

It is significant of progress that vocational training teachers are attempting to find methods of overcoming difficulties of certain tool processes and discover methods of doing work more efficiently, for much of modern progress is largely the result of research in college laboratories. They have opportunities for trying out new methods, but must realize that methods which are justifiable in a school shop may not stand the efficiency test given them by skilled workmen under working conditions in a commercial shop. Specialists in all vocations develop a higher degree of producing capacity than the all-round skilled workman. The latter usually will adopt the methods of the specialist, though rarely equal his speed.

Any intelligent layman who has read articles upon tool processes as applied in manual training schools, published in school papers of ten or more years ago, and compares them with recent articles purporting to deal with problems of shop work from the point of view of vocational training, cannot but be impressed with the similarity of subject-matter and treatment. As a matter of fact, many laymen and educators, whose interests are tied up with either the scholastic subjects or with educational manual training, strongly suspect that the chief difference between the manual training of a dozen years ago and the vocational training of the secondary schools of today is merely one of name.

It would be difficult to enumerate more points of difference between the old and the new than existed in the work of different schools or teachers in the days when the aims of manual training were frankly cultural, or to train the mind and hand to work together most efficiently, and to teach the students the elementary tool processes. Incidentally the elements of freehand and mechanical drawing were taught, and in many schools there were definite attempts to plan the work around the results of a survey of the local industries. The essential differences between the right type of vocational training and the manual training which it has supplanted in many places, should certainly appear in methods of teaching the various tool processes involved in the different forms of construction.

This rather pessimistic line of thought was inspired by an article describing a jig for making the mitered corners of a picture frame, which recently appeared in a school periodical. The making of a miter joint will be used as an illustration of the difference between the methods of work frequently used in the schoolroom and those of the commercial shop.

Like other jigs for the same purpose, the jig functioned outside of the frame, while the inside of the frame

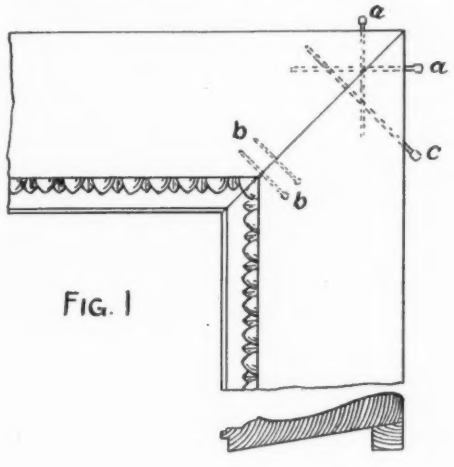


FIG. 1

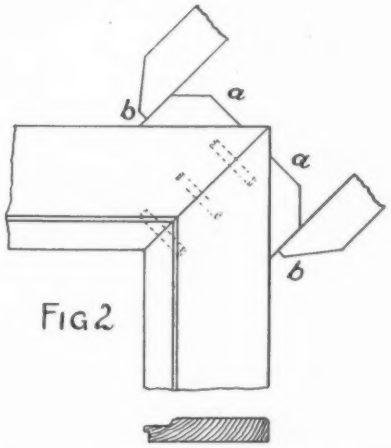


FIG 2

is the edge of the molding which must be accurately placed. Usually such a jig prevents the most effective nailing, and the time necessary for its manipulation will prevent its adoption by the skilled workman in any commercial shop.

The patented mitering and nailing device used by professional picture-frame makers is a great improvement upon the methods formerly used in commercial shops in making gilt and other finely finished frames, but they are seldom seen in carpenter or cabinet shops. This is because the skilled workman with the miter saw or miter cutter and a good bench vise for nailing, can produce more in a given time than with a machine on nearly all of the work in the shop.

To the skilled workmen the suggestion to use such a device would be considered a reflection on his skill, and he would refuse to use it. Not that he would refuse to adopt a real time-saving improvement, but because he knows that in the ordinary run of shopwork he can accomplish more with his usual tools.

You will pardon a personal experience, but it affords an illustration of the point I wish to make: Some years ago I was employed as a cabinet maker in a shop in which the majority of the work consisted in making mirror and specially designed picture frames. Many of the frames were made of stock moldings up to ten inches wide, finished. These were mitered with a circular saw, a foot power miter cutter for narrow moldings, or by a Langdon miter box.

Although one of the mitering machines was always ready for use, it was used only upon a narrow range of work; the joints of the larger frames were fitted by block planing when necessary and nailed as shown in Fig. 1, with 8d or 10d finish nails driven as at a, and 1½" brads or 6d finish nails driven as at b to hold the inside edge of wide moldings when they shrunk. Nails were never driven as at c because they do not hold as well; the joint cannot be drawn together efficiently, and there is always the danger of driving through. If the corners of the frame had been covered by a jig there would have been trouble in driving the nails. If the frame was nailed after removing the jigs, there was the danger of jarring the joint open, and at best the nailing would not be as effective after the glue had set.

In making large mirror frames, sometimes sixteen feet long and four or five feet high for two or three mirrors, the frame was laid flat and fitted and nailed in that position. Usually mitered joints of unfinished wood were doweled as at Fig. 2, two or more dowels being used according to the width of the molding. These joints were

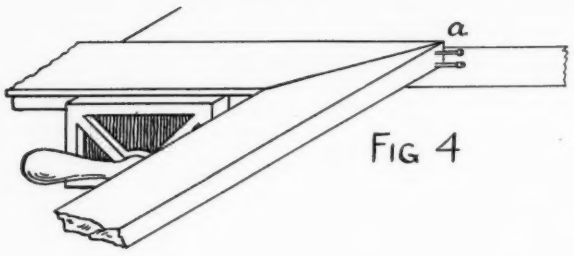


FIG 4

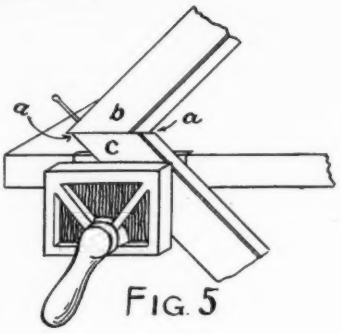


FIG. 5

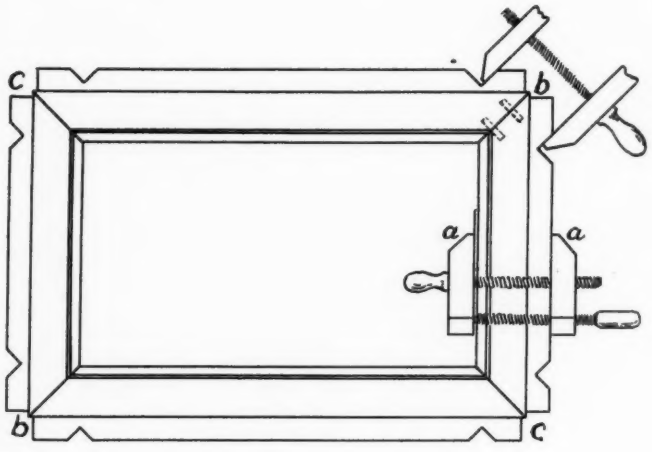


FIG 3

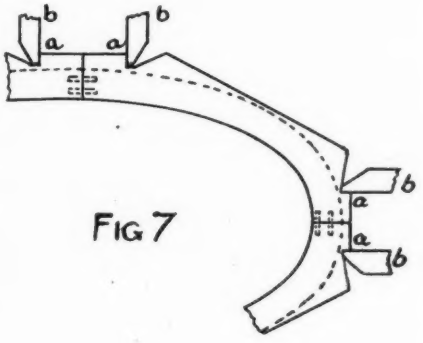


FIG 7

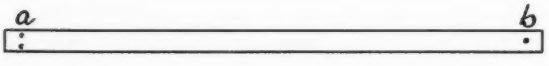


FIG 6

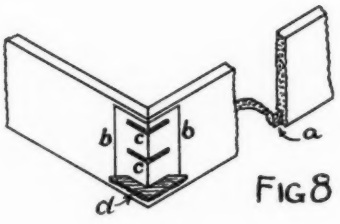


FIG 8

badly twisted material, and then only as accessories to the hand-screws described in Figs. 2 and 3.

The use of clamps requires that the four joints should be assembled at once, which is so difficult to do before hot glue sets that they are almost never used, for there are surer and faster ways of doing the work. Our favorite method in gluing a frame of unfinished molding was to rub glue blocks on the outside of the frame at each mitered corner, as indicated at a of Fig. 2, and allow them to harden for several hours.

The joints were then fitted and doweled, and each of two diagonally opposite corners was glued, hand-screws being used as at b, after which the two halves of the frame were glued and the joints both brought together with the hand-screws. This method never failed if the joints were properly fitted. The blocks a were cut off when the frame was smoothed. If there was not time to wait for the glue blocks a to set, the doweled frame was glued with forms as in Fig. 3. The forms were held in place by hand-screws as at a, the corners bb glued as described in Fig. 2, and corners cc glued in one process. This was an efficient but somewhat clumsy method.

Our favorite method of nailing ordinary miter joints was in a vise, held flatwise for a finished surface, or in case of a large frame, nailing into the edges as at a, Fig. 1, or held in a vise perpendicularly as in Fig. 5, which was the most common method of nailing plain frames if not too large.

Pieces of rubber or leather belting were cemented to the jaws of the vise to prevent defacing the moldings. Holes for the nails were made with an awl in soft wood and the smaller frames, but were drilled in hard wood, or if large nails were to be used, as shown in Fig. 6. Two nails were driven from one side of the joint as at a and one from the other as at b, for if they are driven this way they will not strike each other in the wood.

A man was employed in the shop who did little else than make small stock sizes of picture and mirror frames and frames for the department store and ten cent store trade, orders for which frequently reached into the thousands of one size and kind. Of course, this work was reduced to its lowest terms, soft wood moldings, one nail in each corner, and often without glue. Using a foot power miter cutter for making the miters, and an iron vise for nailing, this man would make these frames at the rate of from forty to fifty frames an hour, day after day. He offered a standing wager that if allowed to select his molding and size of frame, without glue, he could cut and nail 125 of this type of frame in one hour. I never knew him to do it, but it was known in the shop that upon a rush order he had made ninety frames in one hour without serious inconvenience to himself.

The secret of making a miter joint is in making a suitable allowance for the drawing of the nail as it is driven, for it will force the upper, or loose piece to slide by the member held in the vise. Place the upper member b about ⅛" beyond the lower member c, as at a, Fig. 5; as the nail is driven home, the upper member b will slide along the lower member c, as it is forced to a joint. If the work is done skillfully, piece b will stop with a perfect joint when the inside edges of both pieces exactly coincide.

Fig. 7 illustrates a method of making an elliptical mirror frame similar to that shown in Fig. 2. Make and dowel the joints and shape the inside edge of each quarter of the frame accurately; cut notches at a to receive the hand-screws b, and after the glue has hardened, make the outside of the frame the desired shape.

Small trays for silver chests, jewelers' trays and small boxes may be made with miter joints by the method shown in Fig. 8. Rabbet the sides to receive the bottom as at a. If preferred the bottom may be nailed upon the sides. Saw the joints, fit them carefully, and smooth and sandpaper the inside of the tray sides. Glue the joints and hold them together with a piece of stout paper glued around the outside of the miter as at b. After the glue has hardened, tear off as much of the paper as possible and make saw cuts across the corners as at c; fit splines of thin wood which will just fill the saw cuts a and glue them in as shown at d. Trim the corners, fit the bottom and nail it, and smooth the outside of the tray, cutting the paper away at the same time.

A silver chest may be made with miter joints by the same method of fitting and fastening with splines, but it must be held while in the glue by the method illustrated in Fig. 2. An excellent chest may be made by this method, inferior only to a dove-tailed chest.

School shop conditions, whether in manual training or in vocational training, may closely approximate commercial shop conditions in regard to shop administration. But the element of "speeding up" will not be maintained day in and out as this is done in a commercial shop.

True, commercial speed and skill is not the objective of vocational training, but it is a reasonable ideal that identical processes shall be performed in the school by the same methods used in the commercial shop. The writer, for instance, in a shop experience covering more than twenty years in cabinet shops doing custom work, has never seen a jig used in making a miter joint, unless the methods described above may be considered jig methods. Nothing is gained in teaching students of the secondary school vocational classes methods which are scarcely ever used in commercial production.

The central thought in promoting vocational training was that such training would be of greater value to the student who entered commercial work than the old time manual training which it supplanted. If desirable results are to be realized, surely there must be different methods applied in the teaching of the fundamental processes of tool work to students of vocational classes than were pedagogically permissible in teaching the immature students of the grade schools.

In a vocational school the methods by which the work itself is performed are foreign to the administration of the schools. For example, the filling out of printed forms for every conceivable purpose, which is stressed in many school shops, is eliminated to an equal degree in most commercial shops. The efficiency of the workman in performing the fundamental manipulations of material will be the basis of his position in the shop, and ultimately become the criterion by which the particular type of vocational training, under which he was trained, will be judged.

INDUSTRIAL ARTS IN THE BISBEE JUNIOR HIGH SCHOOLS.

Alward M. Boss, Supervisor.

Industrial education along prevocational lines has proven one of the most important factors in the junior high schools of Bisbee. In our three junior high schools we give a course of study which fits well into the needs of the community, as has been proven by the results obtained. A record is kept of the work done by each boy, and from these records we are able to determine the line of work he is best fitted to follow in the senior high school.

To aid in the classification, I have had "pre-vocational cards" printed in our high school printery which show, at a glance, the record of each boy in carpentry, sheet metal work, cabinet making, concrete construction, electricity, applied wood-turning or mechanical drawing.

These cards are filled out by the junior high school instructors and filed with the supervisor, who encourages the boy to take up the line of work in senior high school for which he seems best fitted. I believe that this system could be carried out to good advantage in other junior high school subjects; for I often find a pupil that is not fitted for any line of mechanical work, who might better be preparing for some professional or office work.

The school year is divided into three terms of twelve weeks each, and during each term a different line of work is taken up. In the first term of the seventh grade, cabinet making is handled, as these boys have had very little, if any, previous work. With an hour a day devoted to this work, they are able to gain a working knowledge and the fundamental principles of bench work. And again this work fits well into the form building, necessary to the concrete construction which follows it. In the third term sheet metal work is taken up.

In the eighth and ninth grades carpentry, electricity, applied wood-turning, and a thorough course in mechanical drawing are given.

Each boy is required to take a course in art work, and until I obtained the cooperation of this department, the average boy was not interested in the art work. With the two departments working together, the boys design their foot stools, taborets, etc., in the art room, and do the construction work in the shop. The form designs for fern boxes, benches and other concrete construction are worked out; camp outfits, candlesticks, tin autos, etc., are designed and developments are made for sheet metal work in this class. Thus the value of design is brought home to the boy through the applied shop work and at the same time the pupil brings an artistic appreciation into his construction problems. Very interesting carpentry work is being conducted in miniature in this same way. The house plans and elevations are drawn in the art room; construction to scale is done in the shop, and the house is sent back to the art room where the interior decoration is done by the girls.

Houses of different types are constructed, involving roof construction of various kinds. All studding, sheeting, rafters, joists, etc., are cut to an exact scale; thus an actual miniature building is built. The concrete work is done by the concrete class, the wiring by the electrical class, and the house is papered and painted by the girls of the art classes.

PRE-VOCATIONAL RECORD CARD

Name _____

_____ JUNIOR HIGH SCHOOL

CLASS IN SHEET METAL.

Project	Operations involved	Ability	Grades	
			Drawing	Work
1				
2				
3				
4				
5				
6				
7				
8				

RECORD CARD USED IN THE BISBEE HIGH SCHOOL.

Some larger problems in concrete work, such as the building of sidewalks for the school, and placing concrete bases under heavy machinery have been carried out by the classes.

An interesting problem worked out in one of the junior high schools, was a paper pulp map of the school district. We are located in a mountainous country, and the school district covers some six hundred square miles. The mechanical drawing class obtained many maps of this section of the country, and from the data thus obtained, worked up a map to scale twelve feet square. Elevations, location of roads, street-car lines, bridges and buildings were made.

The map was then made of paper pulp, showing the district in relief. The roads which are concrete were made by the concrete class; the street-car lines, bridges, etc., by the sheet metal class, electrical wiring by the electrical class, and the sixteen school buildings were constructed to scale by the carpentry class.

Many interesting, practical, and instructive problems come up along this line, and if the classes are handled in such a way as to get a check on the work being done by each boy in every class, remarkable results can be obtained. The prevocational work becomes a true vocational guide to the boy, so that upon entering the senior high school, these checks help him to pick out a suitable course, and there is a better chance for him to do good work, and in any future occupation he may pursue, to become a success.

A VOCATIONAL GUIDANCE PROGRAM.

The Department of Public Schools of Providence, R. I., has recently adopted a program to govern the work of the department in vocational guidance. The program which was prepared under the direction of Mr. Richard D. Allen, involves the following purposes:

1. To assist principals and teachers in the educational guidance of pupils by means of accurate measurement of their ability, attainment, and special aptitudes.

2. To prevent hasty and unwise choice of occupations, too early elimination from school, and unwise choice of studies.

3. To insure to each child the equality of opportunity provided in the public schools by adjustments to meet individual needs.

4. To assist able, worthy, and ambitious pupils under financial difficulties to continue their education.

5. To advise pupils concerning opportunities for further education and training beyond that which is provided in the public schools, or concerning occupations and the requirements for success and advancement in them.

6. The department is in touch with many commercial and industrial opportunities and seeks to assist in placing the worker in the work to which he is adapted, and to provide for further training to insure success and advancement. It is not an employment agency and cannot fill rush orders either for work or workers. Placement is only incidental to guidance, both educational and vocational.

The work includes the following special activities:

1. Under the direction of the department intelligence tests have been given to more than two thousand children during the year for the purpose of substituting accurate measurements for guesswork as a basis for efficient educational guidance. In accordance with the results of these tests and good scholarship bright and ambitious pupils automatically become candidates for extra promotions, so that pupils of superior intelligence complete the elementary school course in seven years instead of eight, and pupils of very superior intelligence and accomplishment may complete the course in six years. All pupils entering the high schools are classified by ability in order to prevent unnecessary failures, to insure more efficient instruction, to facilitate necessary adjustments in courses of study before it is too late, and to provide an enriched curriculum for pupils of superior ability. By this plan bright pupils have the opportunity to do an increased amount of work, corresponding to their ability, while the average pupils are covering the regular course.

2. The department supervises and assists in the study of occupations in all seventh and eighth grades and in overage rooms, not as a substitute for vocational advisement, but in order that pupils may have the necessary and accurate information concerning the occupations by which people earn a living, so that a basis can be laid for vocational self-guidance and vocational advisement may be made more effective.

All children who leave the school system before the completion of the high school course pass through the hands of the vocational advisers. In this way unnecessary elimination from school and hasty and unwise choices of occupations are often prevented.

4. Able, ambitious, and worthy children, who are in danger of being compelled to leave school, are often assisted in obtaining part-time employment to enable them to continue their education. Whenever such earnings are not sufficient to meet the situation, aid is provided whenever possible by means of temporary scholarships, usually fifty dollars per term. These scholarships are being secured by public subscription and are administered by the Rhode Island Foundation, a charitable community trust of which the Rhode Island Hospital Trust Company is trustee. Scholarships are granted by the Foundation Committee upon the recommendation of the director of vocational guidance after investigation of the needs of the family by the Providence Society for Organizing Charity and the school nurses independently. In this way the granting of scholarships is protected against political patronage and religious prejudice.

The aim of the Foundation in this work is to be sure that no ambitious, capable, and worthy child in Providence shall be denied the advantages of a high school education on account of the loss or poverty of his parents.

It is the policy of the school department to consider that every normal child is worth four years of education beyond the grammar school, especially if he selects the kind of education that is best adapted to his needs and abilities. Readjustments and adaptations are made through the department of vocational guidance, and when needs arise new courses are devised. The present part-time courses in the Trade School and differentiations now under way in the high schools are illustrations of this policy. The encouragement of the attendance of children in evening schools has also been among the duties of the vocational advisers.

The finished product of the school system, the high school graduate, is invited to use the department for assistance in planning his future education or in choosing, entering upon, and securing supplementary training in his occupation.

The department of vocational guidance is not a bureau outside of the school system, but a part of the system itself. To some extent it performs the functions corresponding in industry to the advertising department, the sales department, the routing department, the inspection or measuring department, the adjustment office, and the salvage department. It advertises educational opportunities; it helps pupils to select and pursue the proper courses in secondary schools; it aids in determining the rate of advancement of exceptional pupils; it assists principals in the measurement and classification of pupils and in the readjustment of courses of study to meet individual needs; it endeavors to make the best possible use of educational by-products, the pupils who leave before completing the high school or trade school course. It is as much an integral part of the school system as in any other department of administration or instruction.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

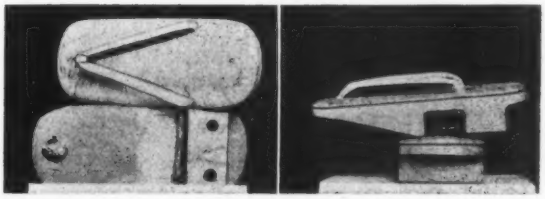
JAPANESE SANDALS?

A "Different" Problem for the Seventh Grade.
Frank Pugh, Supervisor, Kauai, Hawaii.

About this time of the school year the average teacher is beginning to look for something different from the usual run of problems that his classes have been making the same way year after year. In Hawaii we are not bound by the old manual training traditions, but each teacher adapts his group of projects to the life of the particular community in which he lives. The consequence is that Hawaiian school shops can show a more diversified exhibit of skillfully finished problems than most of the mainland schools that the writer has visited.

While boys in the mainland schools will no doubt prefer to wear leather shoes of strictly American design, yet they probably will be greatly interested in a problem that "smacks" of the mysterious Orient and the land of the tinkling ukulele and rustling palms.

The drawing shows all necessary views of a popular sandal worn by the Japanese in Hawaii. The photographs show the sandal and the matting with which it is covered. The thongs which enable the wearer to keep the sandals on his feet are covered with soft material such as plush to prevent chafing. In communities in the mainland where Japanese matting is unobtainable for the top of the sandal, as shown in the photographs, we would recommend a layer of either carpet or plush in its place. The girls wear the same kind of sandals except that the thongs are covered with brightly colored silk. Of course, a pair of sandals for "Dad" will have to be made larger in proportion. At the toe of the sandal where the thongs are knotted underneath, it is the usual practice to cover the under side of the hole with a piece of sheet brass, or a large furniture nail is driven over it. This tends to keep out the dirt also.



TOP, BOTTOM, SIDE AND FRONT OF SANDALS.

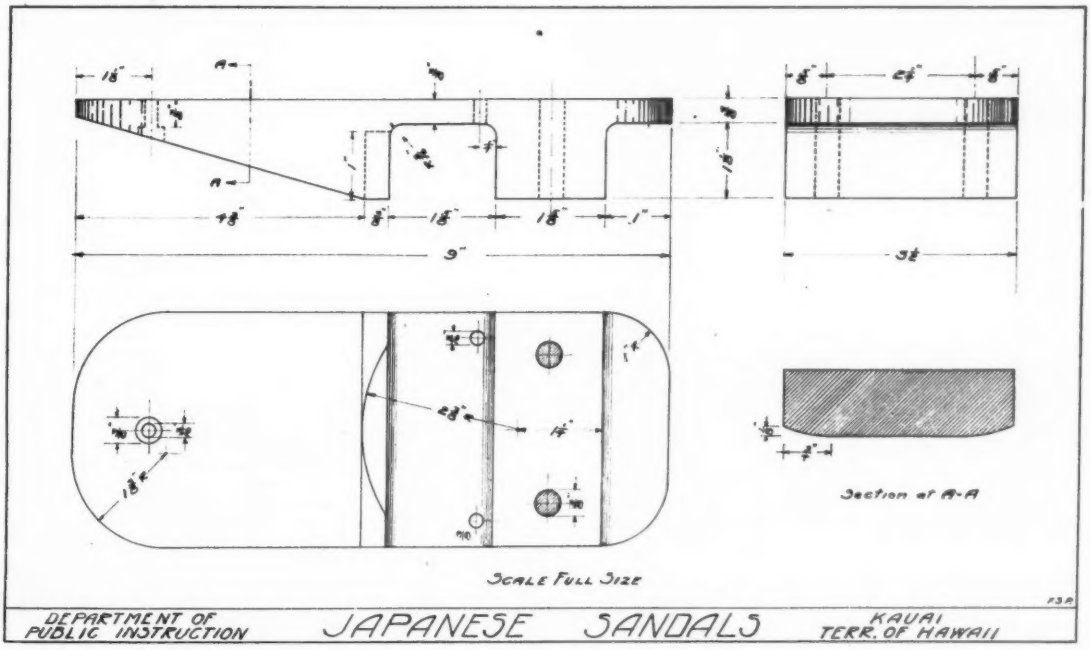
Poplar or ash would be the best material from which to make these sandals, but they are made of many varieties and also finished in different styles and colors. Most of them, however, are left plain without any finish whatever.

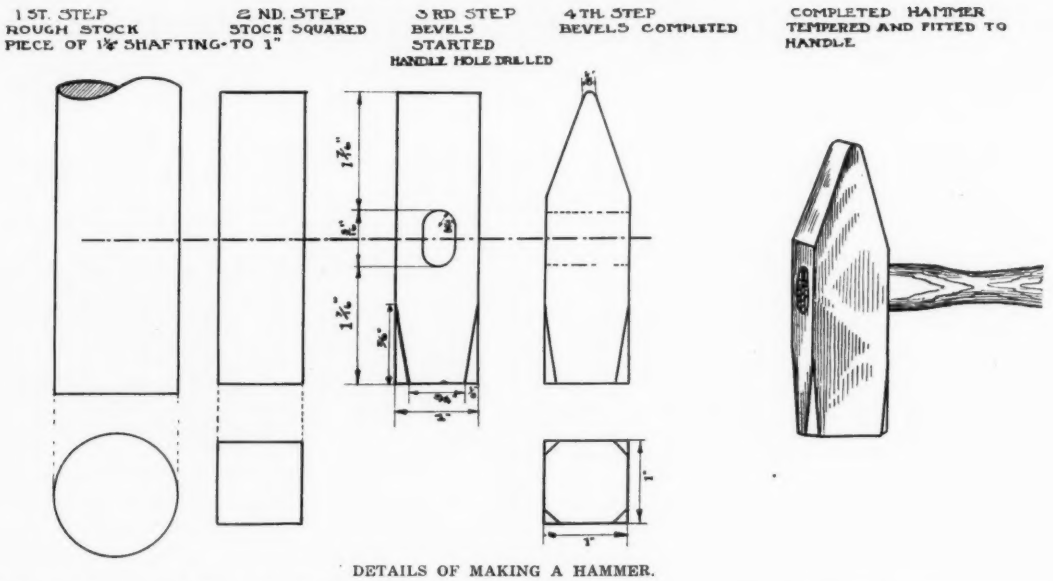
FIRST PROBLEM IN A GRADED COURSE IN MACHINE SHOP WORK.

Alward M. Boss, Bisbee, Ariz.

The machinist's or tinner's riveting hammer makes an excellent problem for first term shop practice. Not only is it a beautiful tool when completed, but it furnishes the training necessary to the development of skill in handling the cold chisel, ballpein hammer and file. The interest created through the fact that a real tool is being constructed, makes up for the skinned knuckles encountered in handling the chipping tools, and also forms an incentive for careful, exact work.

The hammer drawings are first made in the drafting room. There they are traced and a blueprint made for each boy in the machine-shop class. The drawings are designed in different sizes, as it is sometimes desirable to make hammers of different weights. Often a chipping hammer, such as the one in the center of the photograph, is chosen. Exact adherence to all measurements on the





DETAILS OF MAKING A HAMMER.

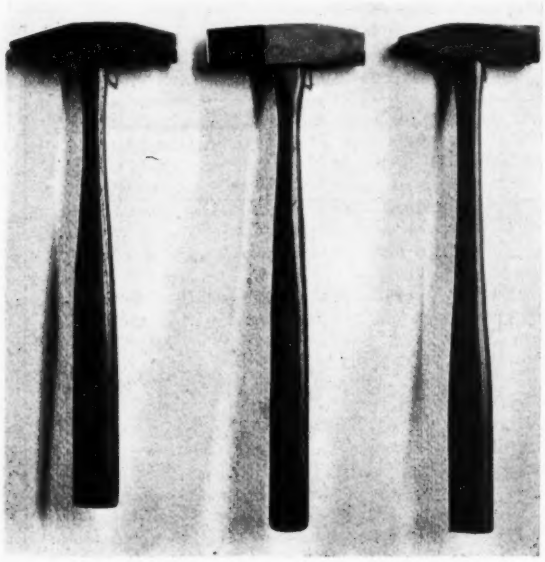
drawing must be observed in order that the desired training in accuracy be obtained.

For stock, we use old broken axles from the auto shop or pieces of discarded shafting. The first step is selecting the stock and cutting it to the approximate length. This latter operation can best be performed on the power hack-saw as the practice gained in cutting by hand does not recompense the student for the labor expended.

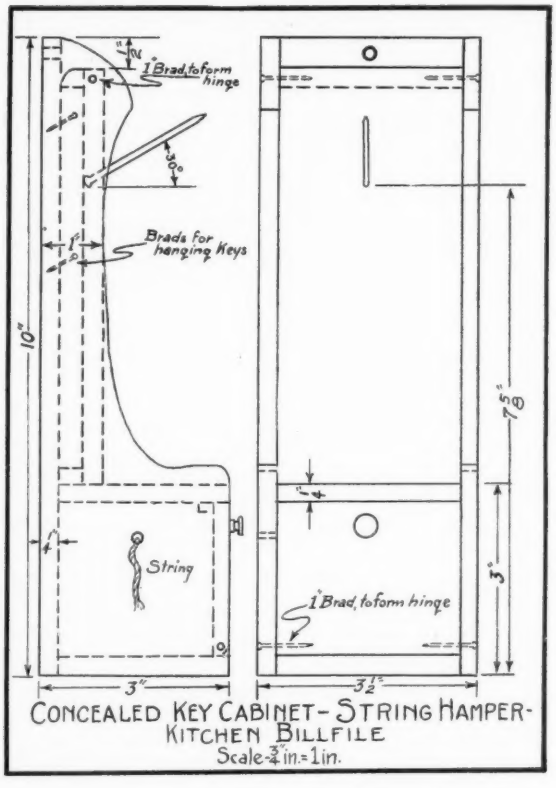
The second step is squaring the shafting. This is done by chipping one side down by means of a cold chisel and a ballpein hammer, and then finishing with a mill file. The face thus found is used to square the sides, and exactness is all important here.

In the third step the bevels are laid off and cut. The hole for the handle is formed by drilling two holes close together with the drill-press and finished by filing to the required size with a rat-tail file.

The fourth step shows the hammer completed. It is then tempered, polished and fitted with a handle.



HAMMERS MADE IN THE BISBEE, ARIZ., HIGH SCHOOL.



CONCEALED KEY CABINET-STRING HAMPER-KITCHEN BILLFILE
Scale-3 in.=1 in.

A HOUSEHOLD UTILITY.

W. W. White, Waterloo, Ia.

The little combination household utility shown in the accompanying working drawing was devised originally to fill a real household need felt by the mother of a pupil. In practice it became a very interesting class project for the boy couldn't be satisfied with a more conventional bit of work. The cabinet was made of waste bits of soft wood stained and varnished.

TABLE AND CHAIR DESIGNED, MADE AND CARVED BY STUDENTS IN SCHOOL OF INDUSTRIAL ART, TRENTON, N. J.

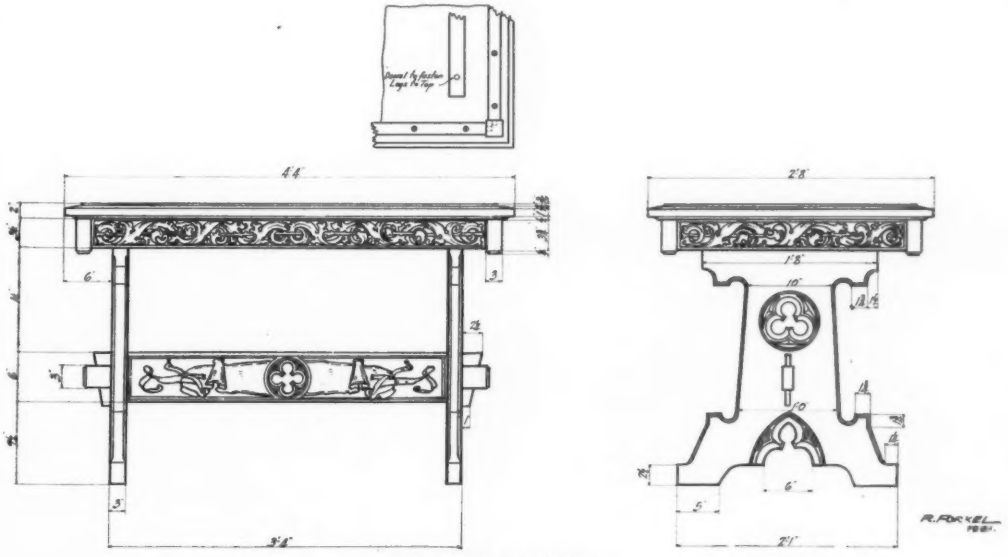
WOOD CARVING.

Reinhold Forkel, School of Industrial Arts, Trenton, N. J.

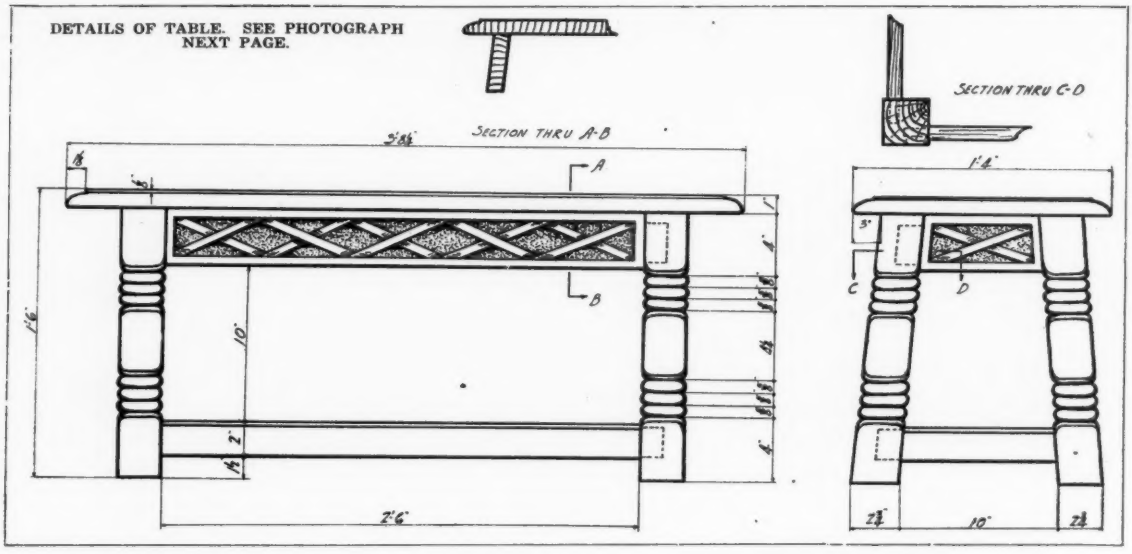
Wood carving is a handicraft which was sidetracked in the last half of the nineteenth century, due to the lack of appreciation and poor education, but has somewhat revived in the last few years through a higher civilization.

Wood carving should to a certain extent be introduced in our schools as it is one of the crafts of refinement which eventually adds greatly to promote skill and ability.

This craft can readily be divided into two classes: elementary and advanced. The former deals with simple carving, as for example, chip carving. Chip carving designs are for the most part geometric, the cutting being done about one-sixteenth of an inch deep. As the work advances, ribbons, bands and fret patterns can be brought into use. Then backgrounds set back from one-sixteenth to an eighth of an inch and involving a study of outlining design and a number of other simple decorations



DETAILS OF TABLE.



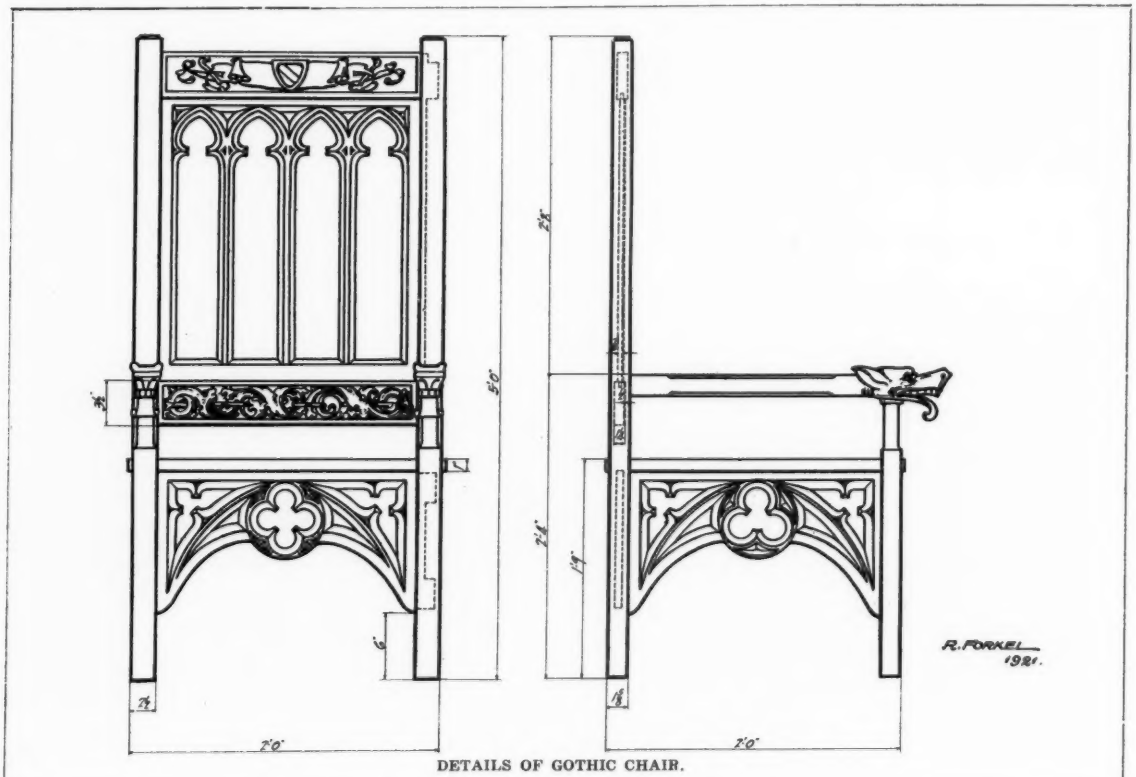
may be safely introduced. As to tools, only a few are required for this work. As an example of simple wood carving, see illustration of the dressing table, Adam style, in the INDUSTRIAL ARTS MAGAZINE for August (page 323).

Advanced carving may well include a study of period ornament and figure. In the teaching of this higher branch, it is advisable to give the student a little modeling along with his study of carving. The figure and design work in modeling gives the novice a quicker insight of the principles of ornament as he has more freedom and play in the clay work. The illustrations of the Gothic table and chair and Pompeiian lamp (August, page 322), are examples of advanced carving.

Working Drawings.

A brief study of the working drawings of the illustrations reproduced with this article will acquaint the reader with the constructions. The table and chair are in late Perpendicular Gothic style. This set is suitable for a private home or church or in a waiting room of a school.

The Gothic style gives us a vast resource in furniture design and ornamentation. It is one of the most interesting styles, for the reason that it can be used in most simplified forms. We have symbols, ribbons, shields, tracery, rag panels, linen fold panels and all kinds of leaf forms that can be utilized to a great extent for school work.



DETAILS OF GOTHIC CHAIR.

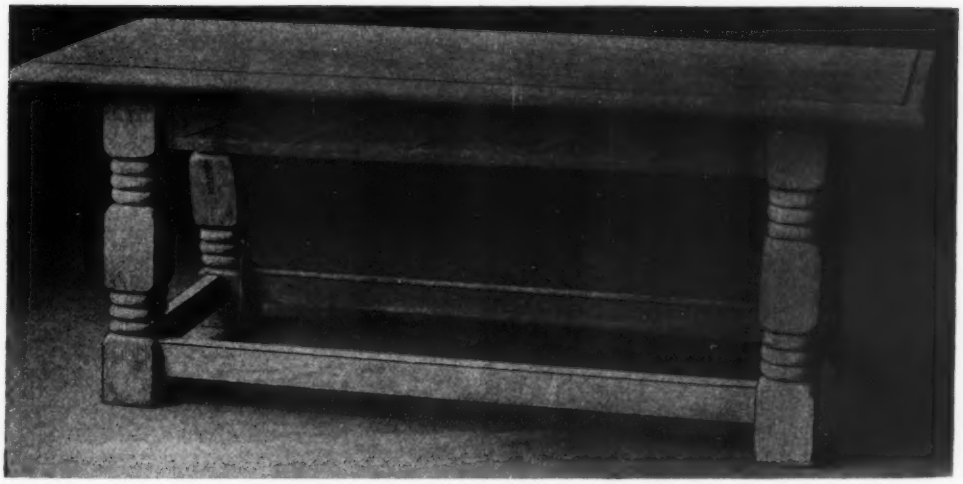


TABLE OF WHITE OAK, WORK OF STUDENTS, THE SCHOOL OF INDUSTRIAL ARTS, TRENTON, N. J.

PRESS ROOM RECORD PLAN.

Henry A. Breucker, Cooperative Printing Trade School, Cincinnati, O.

Blank forms and records are interesting only in so far as they suggest the type of data in shop management which teachers have found to be desirable to obtain as a means of improving the efficiency of their instruction and guiding teachers in their work. Incidentally they show and illustrate the only daily routine procedure of the school shop.

The three cards illustrated on this page constitute a plan for standardizing the marking of students' work in the school press room. Fig. 1 is the daily ticket which each student fills out as a record of his work. The spaces at the bottom of the card are provided for the instructor. With the use of the rating instructions (Fig. 2) it is possible to give each boy a mark on the six qualities upon which he will be judged when he enters a commercial shop. The instructions are sufficiently clear to make the ratings uniform to a remarkable degree. Fig. 3 is a form for recording a summary of the daily marks for reports and for the permanent record.

The plan has worked well in the school shop.

PRESS ROOM CARD Date 6-15-1922

Two weeks ending 6-22

Name John Rodgers

DAYS	TIME	Accuracy	Workmanship	Neatness	Attitude	Dependability	
Mon	F	F	F	A	A	A	
Tue	F	E	E	A	A	A	
Wed	E	E	E	A	A	A	
Thu	E	E	E	A	A	A	
Fri	E	E	E	A	A	A	
Mon	E	E	E	A	A	A	
Tue	E	E	E	A	A	A	
Wed	E	E	E	A	A	A	
Thu	E	E	E	A	A	A	
Fri	E	E	E	A	A	A	
Total							TOTAL AVERAGE

DAILY PRESS ROOM TICKET

Name_____

Job No._____ Time started_____

Standard_____ Time finished_____

Amount run_____ Total time_____

Time	Accuracy	Workmanship
Neatness	Attitude	Dependability

GEAR PULLER.

George Ellison, Boys' Technical High School, Milwaukee, Wis.

To one who owns an automobile and *thinks* he is mechanically inclined, the height of his ambition is to do his own repairing and overhauling when "Lizzie" needs such treatment. About the first thing he does is to invest in a set of wrenches. Before he has gone very far he usually finds there are other tools necessary besides wrenches, and it has been my experience that one cannot go very far without having some means wherewith to pull off gears, collars, etc.

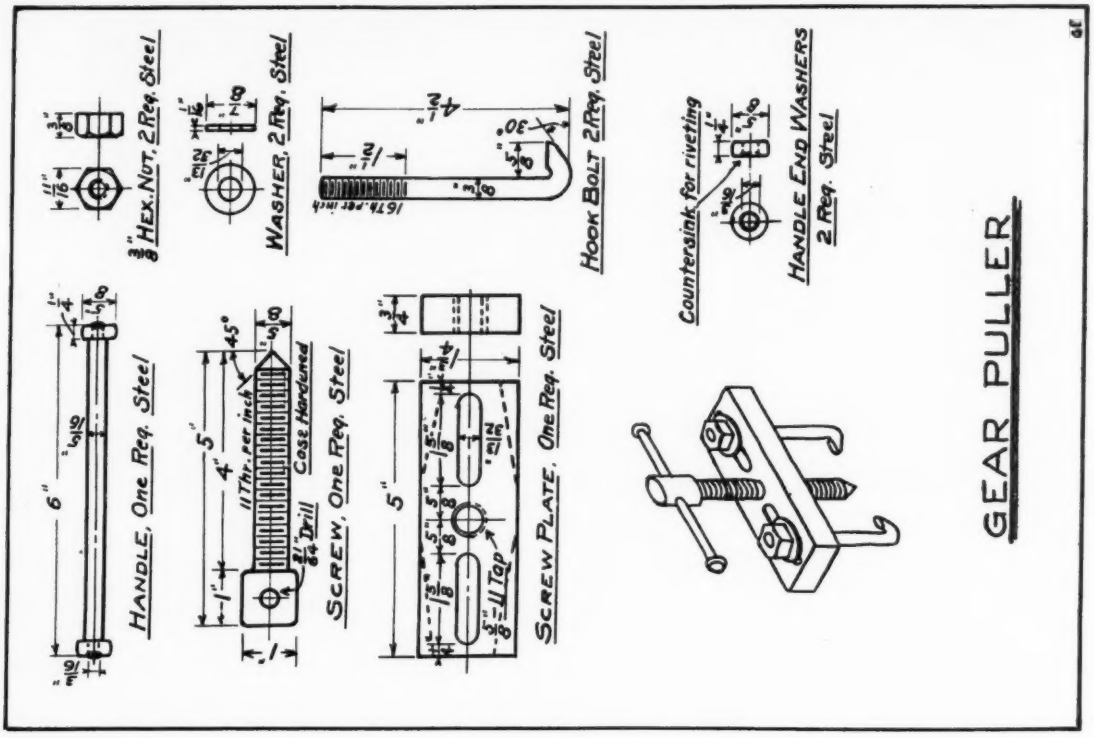
The accompanying drawing of a gear puller furnishes a most excellent project for school metal working classes. It gives the student exercises in turning, drilling, tapping, cutting screw threads, filing, hack-saw work, riveting and bending.

The drawing is complete in all details and needs no explanation. If it is not possible to cut screw threads, a standard $\frac{5}{8}$" square head set screw can be used and a hole drilled through the head for the handle bar. The end of the screw should be case hardened to hold up against the work. The corners of the screw plate may be sawed off as shown by dotted lines. This will make it somewhat lighter. It looks better, but will not improve the working qualities. The hook bolts should be made of a good grade of machine steel and be heated before bending the hook end.

RATING INSTRUCTIONS

	F	E	D	C	B	A
TIME Determined by elapsed time in final test.	2½ hours Very Slow 10 points	2 hours Slow 12 points	1½ hours Moderate 14 points	1¼ hours Average 16 points	1⅛ hours Quick 18 points	1 hour Very Quick 20 points
ACCURACY Based on number of errors in final test.	60 errors 10 points	50 errors 12 points	40 errors 14 points	30 errors 16 points	15 errors 18 points	No errors 20 points
WORKMANSHIP Based on uniformity of color in final tests, thoroughness of oiling and washing-up.	Rough 15 points	Crude 18 points	Fair 21 points	Good 24 points	Fine 27 points	Expert 30 points
NEATNESS AND ORDER Based on care of materials and general appearance of the press and accessories.	Slovenly and Smeary 5 points	Careless 6 points	Fair 7 points	Orderly 8 points	Tidy 9 points	Immaculate 10 points
ATTITUDE The students mental reaction toward his work.	Indifferent 5 points	Perfunctory 6 points	Passive 7 points	Interested 8 points	Eager 9 points	Enthusiastic 10 points
APTITUDE The native tendency of the student to acquire skill in this line of work.	Bungling 5 points	Clumsy 6 points	Handy 7 points	Capable 8 points	Dexterous 9 points	Clever 10 points
	50	60	70	80	90	100

FORMS USED FOR KEEPING STUDENTS' PRESS ROOM RECORD.



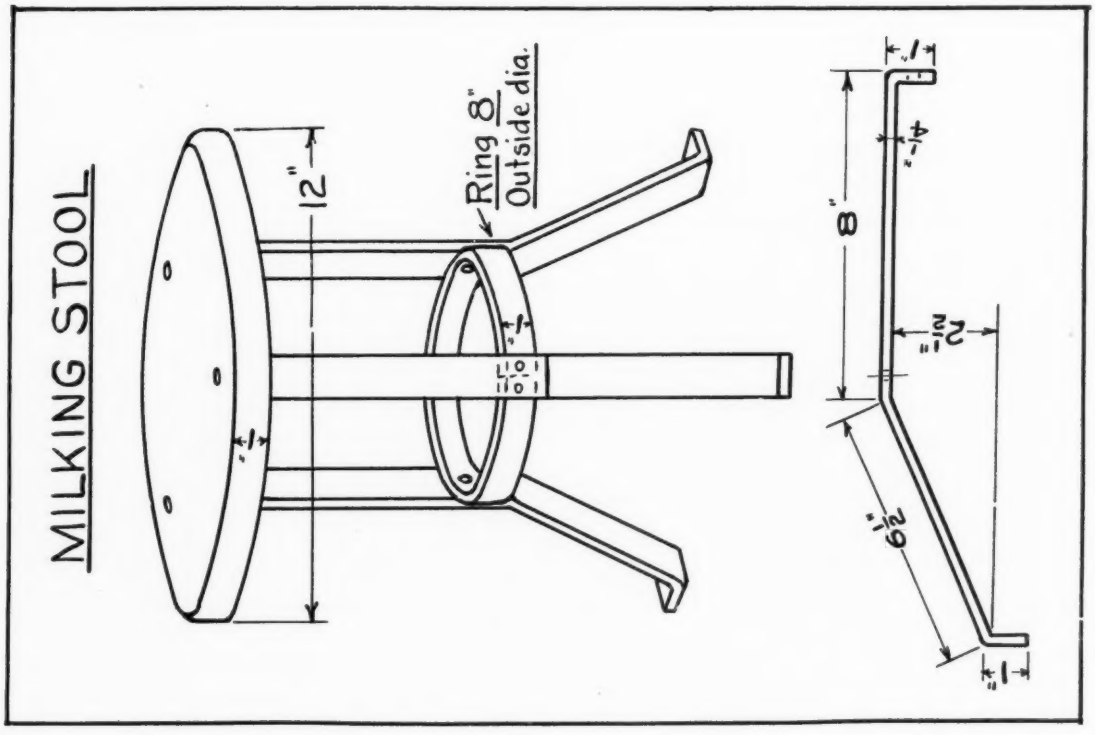
TWO DAIRY CONVENIENCES

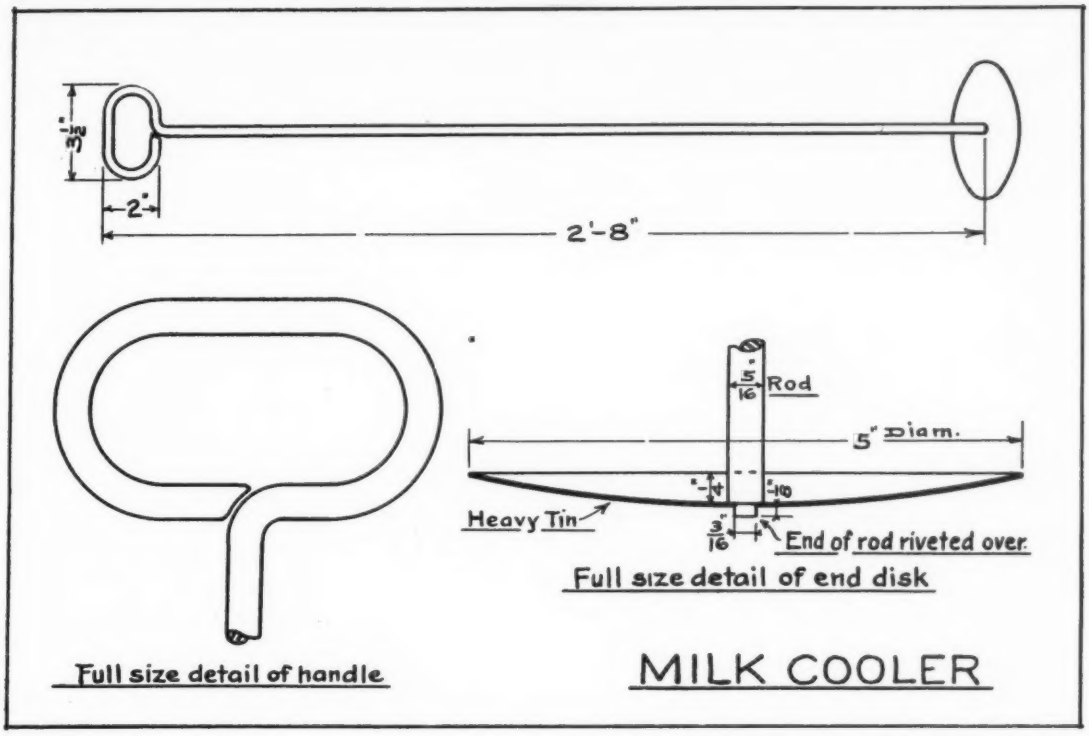
Eber L. Moore, Connersville, Ind.

The milk cooler illustrated in the working drawing is made of one piece 5/16 iron rod 3 feet 5 inches long and one piece heavy galvanized tin five inches square.

The rod is first laid out and the measurements are marked with a scratch awl. The handle is made by cold bending, beginning with the longest dimension and bending until the general direction of the bended part is at right angles to the rod. While bending make all measurements from the main stem of the problem.

With dividers lay out a five-inch circle on the heavy galvanized iron and cut out with shears. Dish the piece by hammering. Drill a hole 3/16" in diameter and after

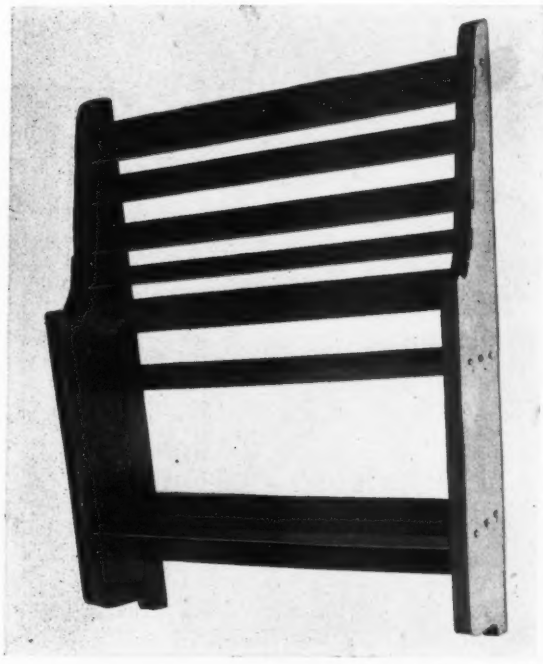




filing a shoulder on the bottom end of the handle, rivet the disk to it.

Milking Stool.

This stool is made of strap iron ¼"x1". All the bending with the exception of the right angle at the top may be done cold. Care should be taken to cut the legs exactly alike. To shape the circle which connects the legs, use a templet of wood.



BOOK SHELVES AND MAGAZINE RACK.

BOOK SHELVES AND MAGAZINE RACK.

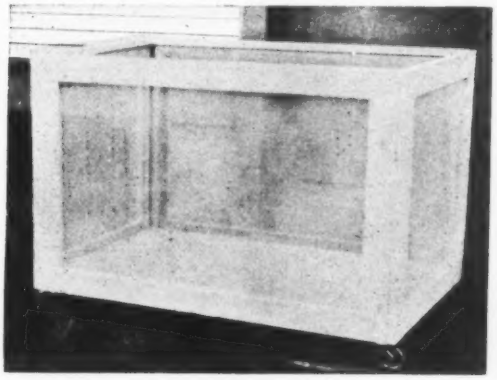
Milo L. Curts, High School, Bloomington, Ind.

The accompanying photograph and working drawing suggest a problem that has proven popular in the Bloomington high school. The drawing is sufficiently detailed to indicate the size and the construction and to suggest variations which may be desirable in the individual homes of students. The problem is best made of hardwood, stained and varnish or waxed.

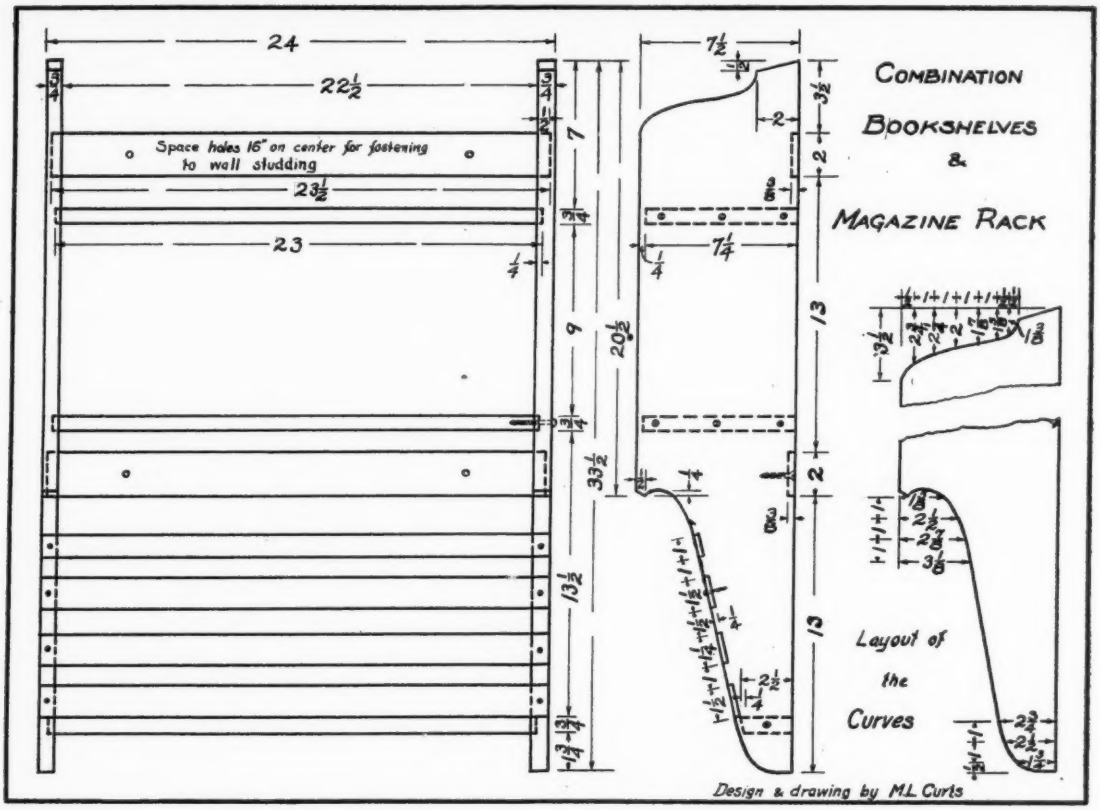
KIDDIE COOP.

Howard R. Porter, Ellensburg, Wash.

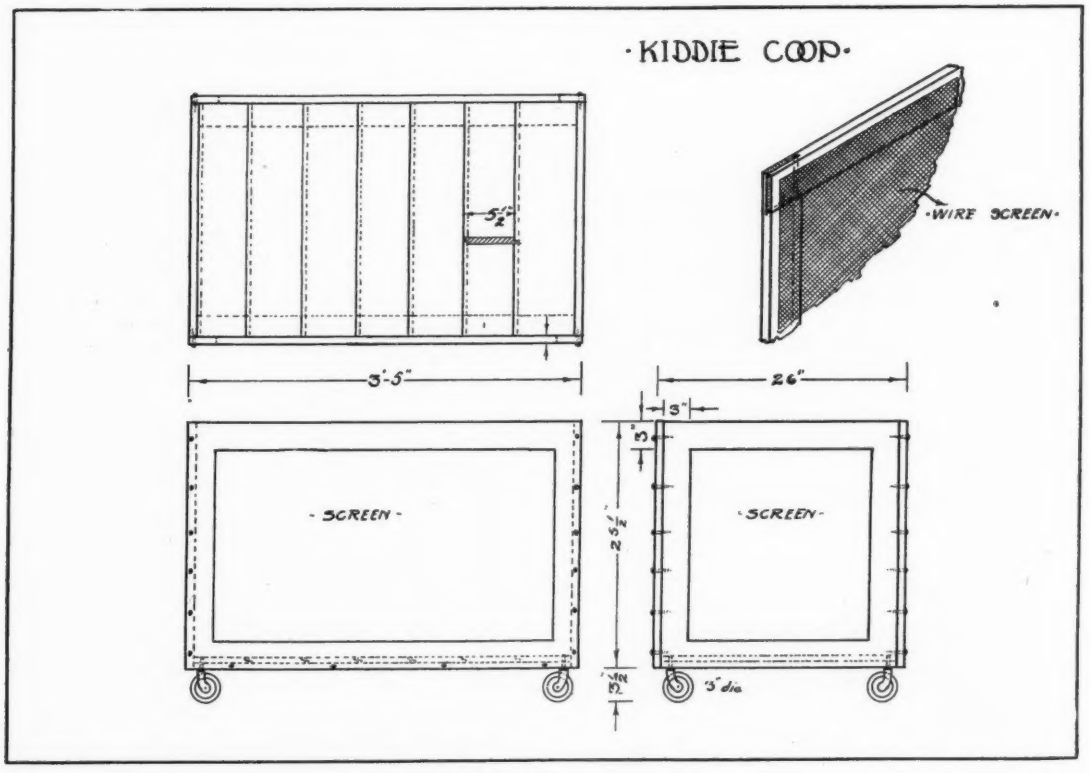
This Kiddie Coop for the very small child is quickly and easily made. The bottom is built up double thickness of any light ¾" wood, such as western cedar or pine. The sides are separate frames with half lap or M and T joints, covered with galvanized wire netting and fastened to each other and the bottom with round head screws. This feature is convenient when it comes to transporting the Coop any distance, since it can be made into a compact package and wrapped in burlap for shipping. The wheels are small rubber-tired tea wagon castors and can be obtained from any manual training supply house. It wheels quietly and passes easily through the ordinary doorway in the home. It is best finished in white enamel.



"KIDDIE COOP."



DETAILS OF BOOK SHELVES AND MAGAZINE RACK.

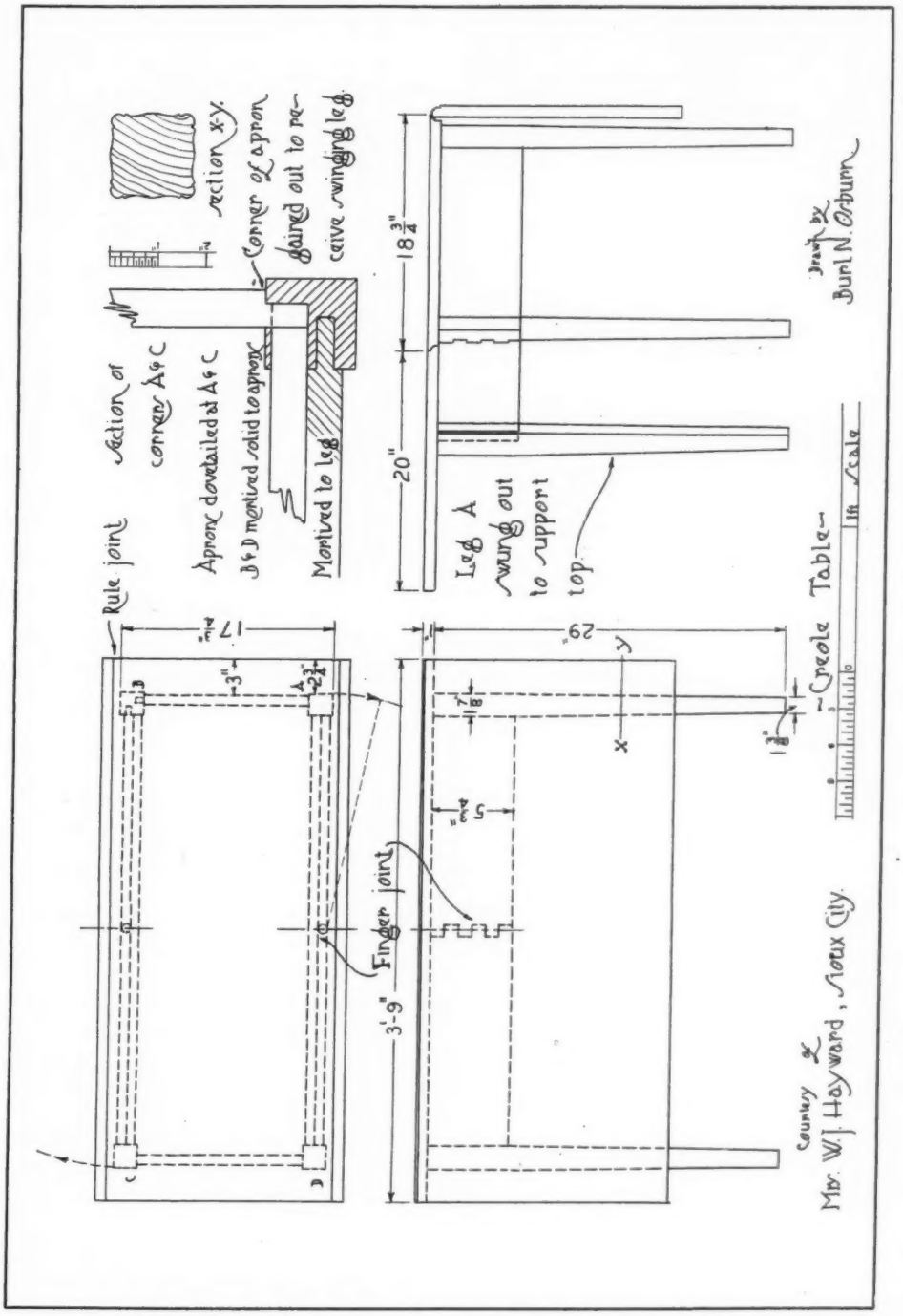


DETAILS OF "KIDDIE COOP."

CREOLE TABLE.

Burl N. Osburn, Cedar Falls, Iowa.

This table is made of mahogany and is more than a hundred years old. It is chiefly interesting because of the unique construction which permits legs A and C to swing out when the leaves are raised.


Section X-Y.
Corner of apron
Section of corner A & C
Apron dovetailed at A & C
B & D mortised solid to apron
Mortised to leg
Rule joint
Leg A swung out to support top
Drawn by Burl N. Osburn
Creole Table
1/4 Scale
Finger joint
3'-9"
Courtesy of Mr. W. J. Hayward, Sioux City.

CUSTOM WORK IN THE ONEONTA PART-TIME SCHOOL.

Under the direction of Mr. E. W. Engler, a considerable amount of mill work has been done by the woodworking classes of the Oneonta Part Time School. The class which consisted of boys of approximately eighth grade ability, were found not to be interested in woodworking of the manual training type and the instructor therefore developed a group of problems of strictly vocational interest. Each problem was undertaken on the group basis and put through according to a modified factory plan. During the school year, which has just closed, this plan was considerably developed from the experience of the previous year and most successful work, both educationally and industrially resulted. The class manufactured porch boxes, and step ladders as individual try-out problems. The work was then undertaken in the manufacture of storm doors, storm windows, window sash, screens and similar articles. For the actual production which was sold locally to individual house owners, the boys were paid a regular wage scale of 25 to 35 cents per hour.

Do's vs. Dont's for Patternmakers

W. Jordon, East High School, Erie, Pa.

With the idea of preparing a sheet of standard suggestions for use in the reference note books of the Patternmaking Trade Students, I originally drew up a sheet of "Don'ts" and then the parallel positive suggestions. After arranging them beside each other and contrasting their worth the value of the Do's was so much greater and accomplished my purpose so much more effectively than the Don'ts that they were submitted to the "Patternmaking Committee of the City of Erie Schools" and were unanimously adopted.

Suggestions For Patternmakers.

Be sure a machine is ready to start before you throw in the power.

It is dangerous to wear long flowing ties, loose sleeves, or rings around woodworking machinery. Keep yourself in trim shape.

Woodworking tools, either hand or machine, are not planned to cut nails, screws and wire. Use tools that are designed for metal cutting.

When you are operating a machine, attend to your business. Accidents happen to the fellow that watches the other workers or looks out of the windows when he should be avoiding danger.

Use a knife and dividers for laying out. The pencil isn't accurate enough.

Know how a job is to be molded before you try to make it.

Does the drawing call for finish? Then be sure to add it.

When constructing a radius keep the center hole small.

Green or wet lumber makes patterns that warp, twist out of shape and check. Usually they have to be made over. Use dry lumber the first time.

Sharp tools do better work than dull ones, in less time. Keep your tools sharp.

Use tools to bring a job to dimensions. Sandpaper is for finishing only.

Leave center lines on the job: the checker will have more confidence in the job and the workman.

A good mechanic always has his own tools, and never borrows the other fellow's tools. Begin now to get your tool box and kit of tools ready.

Learn the names of all the tools connected with your trade.

A patternmaker is judged by the job he turns out and that controls the size of his pay envelope.

Take the blame if you spoil a piece of stock. Be a man.

Keep the top of your bench in first-class condition. It should show no marks or scars of any kind. Take care of your planes and other tools.

Use plenty of oil on oilstone or slipstone. The tool is sharpened quicker and the stone is not glazed.

Mark your jobs for identification before you hand them in.

Anything that is worth while doing is worth doing the best you can.

Good suggestions are always acceptable; don't be afraid to make them.

The tool rest on a lathe should be set as near the work as possible.

When you force calipers over a job, you will not get an accurate result.

Remember, "Cleanliness is next to Godliness."

Glue should be used at 150° Fahrenheit, and thin enough to run well. You don't gain anything by using glue that is too thick or too cold.

Attend strictly to your own affairs. If you don't bother the other fellow he will be more likely to leave you in peace.

Don'ts For Patternmakers.

Don't start a machine until it is ready to do so.

Don't wear long flowing ties, or loose sleeves or rings around woodworking machinery.

Don't try to cut off nails, screws or wire with woodworking machinery or hand tools.

Don't operate a machine and try to watch the other fellow or look out the window. It is a sure way to get hurt.

Don't lay out with a pencil. It isn't accurate enough.

Don't try to make a job unless you know how it is to be molded.

Don't forget to add finish when called for on a drawing.

Don't have a "POST HOLE" for a center when constructing a radius.

Don't use green or wet lumber in making a pattern or layout; it will only warp, check and twist out of shape and the pattern will have to be made over.

Don't try to save time by using a dull tool; a sharp one does better work in less time.

Don't depend on sandpaper to bring a job to dimensions. Tools are for that purpose.

Don't try to plane or sandpaper center lines off. The checker will have more confidence in the job if he can see them.

Don't borrow the other fellow's tools: a good mechanic always has his own.

Don't fail to learn the names of all tools connected with your trade.

Don't forget a patternmaker is judged by the job he turns out and that controls the size of his pay envelope.

Don't try to blame the other fellow or hide it if you spoil a piece of stock: tell your instructor; it probably can be used differently. Be a man.

Don't slide anything over your bench top which will mar its surface.

Don't try to sharpen a tool on the oilstone or slipstone without plenty of oil on them.

Don't turn in a job unless it is marked for identification.

Don't forget that anything that is worth while doing is worth doing the best you can do it.

Don't be afraid to make suggestions: good suggestions are always acceptable.

Don't try to turn a job on the lathe with the tool rest too far from the work.

Don't try to force calipers over a job because the result will not be accurate.

Don't forget, "Cleanliness is next to Godliness."

Don't try to glue up a job with the glue too thick or too cold; 150° Fahrenheit is the best temperature.

Don't bother the other fellow.

PRESENT STATUS OF HOME ECONOMICS EDUCATION.

Home economics educational courses have undergone a satisfactory reorganization following the somewhat disturbed condition due to war work and emergency aid. There has developed a vigorous and sustained effort to emphasize, in all classes, the relation of home economics instruction to healthful living, financial thrift, and social service.

A number of extraneous forces have reacted upon home-economics education: The widespread interest in child health and welfare, with special stress upon the generally prevailing condition of malnutrition, has opened avenues to home economics trained women for service in the conduct of food clinics, nutrition classes, and the redirection of school lunch-room management. Physi-

cians and hospital authorities have recognized, as never before in the practice of medicine, the relation of diet to disease, and the need of highly trained home economics women as prescribing dietitians. Operators of industrial plants and administrators of mercantile establishment have employed home economics women to supervise their social service. Banks have established home-economics graduates as advisers of their women depositors in the division of their incomes and in methods of wise spending. These various outside forces have modified, as well as intensified, the home economics instruction given in universities, colleges and normal schools.

Universities, colleges, and normal schools offering home economics courses.—The number of institutions of higher education maintaining courses in home economics has not greatly increased during the past year. At present all state universities except six and all land-grant colleges for white students except five offer home economics. Those not providing for this instruction are usually institutions for men which either actually exclude women or discourage their attendance. Home economics departments are supported by 177 normal schools, which employ 379 teachers; 306 colleges and universities employ 1,133 teachers of home economics. Besides these institutions, almost all academies and junior colleges admitting girls offer courses in this subject

Home economics in liberal arts courses. — Home economics is accepted in many liberal-arts schools as an essential part of a woman's well-rounded education. This sentiment is reflected in the University of Oregon, where there is a strong demand for certain courses that will be of special value to students preparing for professional life as journalists, doctors, social workers, physical-training teachers, etc. It is felt that the courses in the care of children and care of the sick, together with elementary dietetics, and household budget making, are needed by all women students as part of a well-rounded training for citizenship, as well as by those who plan a definite "homemaking" or professional home economics career. These courses, already very much in demand and successfully developed during the past two years, will be greatly strengthened in the future.

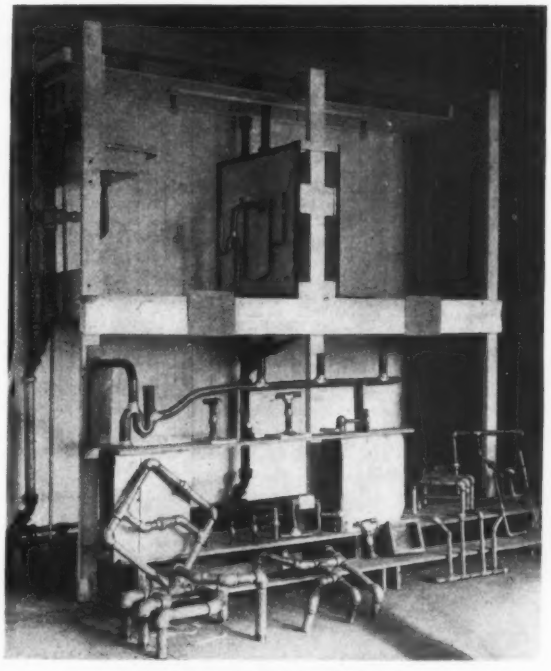
New courses in child feeding and welfare.—Child-feeding and child-welfare courses have been added to the home economics departments of many institutions of higher education, and special instruction in advanced nutrition classes has been given a prominent place in these schools.

In Purdue University two new courses have been developed this past year, the first being a course in child care and management, offered to seniors specializing in home economics. This course included three lectures and demonstrations per week for one semester. There have been 63 enrolled in the class, and the students have been greatly interested in the work. The instructor is a graduate nurse who is also a graduate in home economics and is a woman who has had a great deal of experience in connection with the care and handling of children.

Michigan Agricultural College offered an elective course in advanced nutrition during the past year, which attracted 41 seniors. It is especially planned that this course shall lead to nutrition clinics for the mothers and children of Lansing. Already these graduates have been called to assist in other cities in this type of social service.

Oregon Agricultural College, the University of Minnesota, Cornell University, and other colleges and universities had babies or small children in the practice houses, in order that the courses in child care might be more valuable.

Courses in the conduct of school lunches.—A generally accepted dictum is that all public-school lunch rooms should be under the supervision of the home economics departments. In consequence of this many institutions are establishing cafeteria courses. Purdue University, Kansas State Agricultural College, and Oregon Agricultural College are among the colleges reporting these courses.



PLUMBING EXHIBIT, JUNE, 1922.
BALDORIOTY DE CASTRO TECHNICAL SCHOOL, SAN JUAN, P. R.
Harry E. Jarrett, Instructor.

The rural-school hot lunch has been given special attention in the home-economics departments of normal schools. Georgia Normal, at Milledgeville, South Dakota Normal, at Aberdeen, and the normal schools of the state of Washington have conducted intensive courses in rural-school lunch work.

Specialized courses for dietitians.—These courses are now offered in all leading home economics schools. The Battle Creek School of Home Economics requires that its graduates have actual experience as student dietitians before accepting administrative positions.

At Drexel Institute the course comprises two years' work after high-school graduation. The students take standard courses in organic chemistry, inorganic chemistry, technical chemistry, physiological chemistry and pathological chemistry, physics, bacteriology, institutional cookery and management.

Graduates of the University of Wisconsin, Ohio State University, Iowa State University, and other similiar institutions are now prepared to be prescribing dietitians.

Home economics in public high-schools.—There are now more than 8,000 high schools offering to girls the opportunity to elect one or more years of this work The annual increase in the number of high schools offering home economics has been about 600.

A questionnaire sent to all high school principals resulted in answers from about fifty per cent. One state, Illinois, contributed 311 replies. Of these 311 high schools 184 maintained courses in home economics. These schools had enrolled 13,334 students in the regular high-school home economics classes and 1,753 in high-school classes, aided by the Smith-Hughes Act.

Since it is the larger high schools which support departments of home economics, it is evident that the majority of all high-school girls in the United States now have an opportunity to study home economics if they so elect.

Statistics show that the high-school girl frequently fails to avail herself of this opportunity. This failure may be traced to difficulties in adjusting schedules to courses requiring the long period usually considered nec-

essary for home economics work. Chicago is leading in the experiment of teaching home economics in 60-minute periods.

Girls entering high school generally choose commerical courses, trade courses, or courses in liberal arts, preparing for college entrance. A fully organized continuous home economics course either interferes with their pursuit of a chosen course or else is not so presented that they realize the value of home economics as a part of their general education.

In order to make home economics attractive to *all* high school girls, the home economics high-school teachers of Chicago passed a resolution and presented the same to the city superintendent of schools, requesting that the present four-year course be abandoned and in its place six separate semester courses be offered. They further requested that in planning high-school courses next year it be made possible for every girl in a regular course to take an elective in household arts any semester.

The idea actuating these requests is that *all* high-school girls should have an opportunity to take *some home economics* instead of each girl being forced to choose between a four-year course in home economics and exclusion of all home economics from her high school studies.

In Los Angeles and several other cities home economics is now required for one high-school year, while in Berkeley, California, certain home economics units are included in the social-science course.

Home economics in public elementary schools.— The rate of increase in the number of public schools maintaining departments of home economics has been normal,

Two thirds of all the larger school systems report that home economics is required of all girls in the seventh and eighth grades. In a considerable number of cities it is required of fifth and sixth grade girls as well as of those in the upper two grades.

The great number of girls reached by instruction in home economics is indicated by the following figures, taken from reports of various cities chosen at random:

Boston, Mass.

Fourth grade	5,950
Fifth grade	5.234
Sixth grade	5,335
Seventh grade	4,900
Eighth grade	4,561
Total	25,980

Los Angeles, Calif.

Fourth grade	2,498
Fifth grade	4,300
Sixth grade	3,931
Seventh grade	3,385
Eighth grade	2,305
Total	16,419

Philadelphia, Pa.

Fifth grade	13,126
Sixth grade	12,117
Seventh grade	9,298
Eighth grade	8,035
Total	42,576

In the elementary schools of these three cities alone 84,975 girls received some training in the arts of the household. When to these are added all of the girls in the sixth, seventh, and eighth grades in Chicago, the seventh and eighth grades in New York, Cleveland, Detroit and all other larger cities in the United States, it is inevitable that there must be finally a marked effect on all American homes.

There is a general effort to insure that the school home economics education functions in the home life of the girl, that efficient methods of work are taught, and that the best standards of American living are maintained. Establishment of health habits and preparation for home helpfulness are the dominant motives now determining the courses of study and the methods of instruction. Hence home economics in the elementary schools has undergone interesting modifications of work, as the following quotation from one city supervisor of home economics indicates:

"This year we have made the work in nutrition more concrete and vital by relating it more closely to the feeding of children. Every girl was weighed and measured and taught to keep her own record. If through her knowledge of foodstuffs her weight did not become normal through modified diet, then the cause was found. This gave rise to study of the relation of personal hygiene, tonsils, adenoids, teeth, etc., to health."

"The results were most gratifying. In many cases parents appreciated the situation and responded and the whole family benefited.

"We plan next year to have every girl in the schools taking domestic science to be personally responsible for the improvement in diet and health of at least one child outside her immediate family. Credit will be given on the results."

In San Francisco the home economics department took over the management of the lunch room of the Buena Vista School, where a group of 50 undernourished children were cared for in open-air classrooms by the Associated Charities and the Antituberculosis Association. There were eighteen girls in the cooking class of this school who prepared the hot drink or hot dish that was served every day. The girls worked in groups of four, under the supervision of a domestic-science teacher on one day of the week and with a student teacher from the Lux School on the other days. The meal was served in pleasant surroundings, and the children gained in weight. They were taught table manners and and habits of neatness.

The making of simple wash dresses is now introduced in the sixth grade of the Los Angeles schools, whereas a few years ago the use of the sewing machine was delayed until a girl reached the high school.

Home teachers.—The law of California permits the employment of one home teacher for every five hundred pupils in attendance. Not all the cities have availed themselves of this opportunity of articulating the school with the home, but at the beginning of the second emester, in January, 1920, the board of education appointed a home-economics teacher as the first home teacher in the Berkeley schools. Her function is the correlation of the work of the home and of the school. She counsels with the mothers and in nearly every case brings about improved conditions, either through cooperation with the Berkeley dispensary or through beneficial changes in the home. She conducts nutrition classes for the pupils of the fifth and sixth grades in the two schools where she works. Among the results already accomplished are the substitution of hot milk or chocolate and cereal for the coffee and bread which formerly composed the breakfast for a large proportion of the children, the formation of "anticoffee clubs," the increased use of fruits and vegetables, and the general intelligent reorganization of the diet, not of the children only but of many entire families.

It is the aim of the home teacher to use the facilities of the domestic-science rooms to give lessons in better home making to the foreign-born mothers. Promising beginnings have been made this year. It is a question of time only when there will be regular classes of women meeting in the two schools for the study of nutrition, hygiene, and other subjects that make for better homes and families.

Vocational home economics.—Almost all of the supervisors of home economics in the various States are paid about one-half of their salaries out of Federal money appropriated by the Smith-Hughes Act. Following the appointment of these supervisors vocational home economics has been developed along different lines in different States, depending almost wholly on the interpretation placed upon "vocational home economics." If this term is given by the State authorities, the interpretation generally accepted by educators as the meaning of "vocational," then the reports of the State supervisors of

home economics resemble the following received from Wisconsin: "Total number of schools receiving Smith-Hughes aid for home economics, 68, divided as follows: part-time school, 32; 'night schools,' 30; all-day schools, 6."

If it is assumed that all home economics is vocational, then the reports are similar to that of Nebraska, which shows Federal aid and supervision, supported partly by the Federal Government, for two night schools and 43 standard high schools, or that of Minnesota, where Federal aid is extended to one night-school class and eight regular day schools.

The confusion as to the meaning of vocational home economics will tend to clarify itself in succeeding years.

Home demonstration work under the Smith-Lever Act.—More than 1,000 women are now engaged as agents in home-demonstration work. This is one of the most important types of home-economics education. Usually these agents are women educated in home economics and graduates of colleges, universities, or normal schools.

Their methods of approach in their special field differs in different sections of the country. One county agent in Tennessee established a nutrition clinic for rural children. She cooperated with the Farm Bureau, the county board of education, and the local parent-teacher association.

Two thousand five hundred children were examined and a class of 15 was selected for demonstrating methods of overcoming the condition of malnutrition.

In general, the home demonstration agents strive to assist the rural housewives in applying business principles to household tasks for the purpose of making the farm home as efficient as the farm, and thus contributing to the development of a better type of rural life.

VOCATIONAL EDUCATION ASSOCIATION CONVENTION.

The next convention of the Vocational Education Association of the Middle West will be held in conjunction with the American Home Economics Society and the National Vocational Guidance Association November 29-December 2, inclusive, at the Cass Technical High School, Detroit, Mich.

The headquarters for the convention will be at the Hotel Statler. Space for the exhibits has been provided in the Cass Technical High School. There will be 64 booths in which displays of all kinds of equipment, textbooks, etc., will be shown. The Detroit schools, alone, will furnish educational exhibit material which will be highly instructive.

A number of educational speakers of importance have been invited to address the meetings. The general sessions will be held on Friday evening, Saturday morning and Saturday afternoon. The remaining sessions will be devoted to the several section meetings and round-table discussions. Some of the topics to be discussed in these meetings are commercial courses in junior and senior high schools, commercial work in continuation schools, commercial work in evening schools, retail education, industrial work in continuation schools, industrial arts in junior and senior high schools, home making, home economics in continuation schools, problems in agricultural apprenticeship training, evening industrial schools, apprenticeship training and training of women in industry.

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STUDENTS BAKE LARGE CAKE.

Photo of what is believed to be the largest cake ever baked in the city of Chicago, which was exhibited at the Lane Technical High School recently along with other interesting exhibits of goods produced by the students of that school.

In addition to these, there will be educational dinner meetings called by the technical, commercial and agricultural sections of the Bureau of Education and the Federal Board of Vocational Education.

Information concerning the meeting may be secured from Mr. L. H. Wahlstrom, Secretary, 1711 Estes Ave., Chicago, Ill.

GROUP PRODUCTION OF CHAIRS FOR THE ROOSEVELT JUNIOR HIGH SCHOOL, COLUMBUS, OHIO.
The class, under the direction of Mr. R. Gubsch, instructor, made a large number of chairs for the school auditorium stage and office.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Wood Finish Problems.

313. Q:—1. What are the properties of Methyl-acetone? Can I use it to dissolve celluloid to form a varnish to coat wood?

2. What is Pyroxylin, used to turn Amyl Acetate into commercial Banana oil?

3. Is there any book giving the names, colors and mordants for the various dyes, and the properties of chemicals; that is, useful to a layman?

4. Do the straight Aniline water soluble dyes require mordants when used on wood to keep them from fading? —H. D.

A:—1. Methyl acetone is an alcohol like liquid and has for its derivation the process whereby wood alcohol is manufactured. Technically it answers to the following specifications. Its specific gravity is 0.841 at 15° C. Color should be water white. The boiling range which also includes B. P. is 49 to 60° C. It runs 7 lbs. per American gal. of 231 cubic inches and is used in lacquers, as a paint thinner and in paint removers. Dissolves nitro Cellulose. It is miscible with water. It can be used to dissolve celluloid to form a varnish as a wood coat. I would seriously advise, however, that you disregard the current literature giving popular formulae for the production of a cellulose varnish from scrap celluloid. The results are extremely uncertain and should be undertaken only by a competent chemist who has the ability for forming a complete careful analysis of his raw materials and is thereby prepared to avoid the troublesome and frequently dangerous reactions which occur from the scrap celluloid. Furthermore, coatings of this type to date have only been applied successfully with efficient spraying apparatus and have not been practical as a brushing varnish.

Your second question, "What is pyroxylin, used to turn amyl acetate into commercial banana oil?" is a mixture of synonymous terms and therefore confusing, since banana oil and amyl acetate are the same thing. The pure amyl acetate contains odorous bodies which give it the odor of pears while the technical or commercial grades contain added impurities suggesting the odor of bananas, Its formula is $C_5H_{11}O_2$ and is prepared by distilling mixtures of amyl alcohol, sodium acetate and sulphuric acid.

Pyroxylin is a form of nitro cellulose composition similar to celluloid but without the camphor groups of the latter. Of late years it has frequently been the base of DuPont and similar lacquers. The production of a satisfactory lacquer is an extremely technical proposition calling for very exact laboratory control since slight amounts of acidity not easily detected by ordinary means frequently render the product worthless even though it may appear at first glance to be a suitable material.

Of course, I have no means of knowing the extent of your technical education and, therefore, I am at a loss as to just what to suggest in the way of a book on dyes. The only complete publication of this type giving all formulae, etc., is that by Fay which, however, represents the nth degree of technical information. The only one which suggests itself at all as being possible is that of Dr. J. M. Matthews, "Laboratory Manual of Dyeing and Textile Chemistry," which I believe can be secured through D. Van Nostrand Company, 25 Park Place, New York City. This book is extremely well balanced in laboratory and technical problems and in addition secures a very definite comprehension of the subject matter through the use of a series of leading questions of the deductive type at the end of each chapter. In regard to the literature treating with the technical use of dyes as applied to woods there is practically authentic material available for which reason I am now undertaking the writing of a book which will endeavor to offer some light on this subject. It will take some time, of course, to prepare this.

It has been my universal practice of late years to assume that most anilines when used as a stain on wood require some form of chrome mordant. For instance, in the production of browns and mahogany shades, I generally include enough bichromate of potash, K_2Cr2O_7, or its analogous sodium salt which I find can be used interchangably with potassium salt, to the extent of 20 to 25 per cent of the formula. This may be mixed directly with the aniline solution in the case of acid types which alone with a possible two or three exceptions seem to be of any value as wood stains.—**Ralph G. Waring.**

NEW BOOKS.

Jigs, Tools and Fixtures.

By Philip Gates. Cloth, 195 pages, illustrated. Price, $2.50, net. D. Van Nostrand Co., New York, N. Y.

This work is written for the apprentice as well as the experienced tool maker and draftsman. The author has had wide experience in England and writes entirely from the standpoint of British practice.

Engineering Drawing.

John Maxton and G. C. Malden. Cloth, 251 pages, illustrated. Price, $3.00, net. D. Van Nostrand Co., New York, N. Y.

This book is intended for self instruction and is addressed to experienced engineers. It is of the formal type and contains much detailed information on drawing instruments and materials, plane geometry, projection of shadows, shading and coloring, etc. The actual instruction in projection drawing and sketching is limited to two long chapters and takes up only the methods which apply to machine drawing.

Hand Book for Electrotypers.

By John F. Locke. Paper, 12 mo, 35 pages. Price, $1.00. Published by the author, Cincinnati, Ohio.

This book is the outcome of a series of lectures delivered at Woodward high school to the electrotypers of Cincinnati and other apprentices. It outlines the fundamental chemical principles and chemical facts which enter into the making of electrotypes. The discussion is entirely practical and introduces just sufficient chemical and electrical theory to make the common phenomenon and the ordinary difficulties of electrotyping clear to the practical, successful man. The author has had experience both as a teacher and as a consulting industrial chemist and he writes with a full understanding of the ability and of the experience of the average electrotyper. A supplement contains various useful tables of weights, measures, and rules for computing electrotyping facts.

Intelligence of Pupils. Mr. John L. Stenquist, Director of the Bureau of Reference, Research and Statistics, New York City, in a report on a group of fifty high school boys who failed in first-year subjects during the fall term of 1921-22 in Commercial High School, has commented briefly on certain features. The fifty boys were given not only the Mentimeter test of intelligence, but also the Haggerty Delta two intelligence examinations. The average scores obtained in these two tests were converted into the corresponding mental ages by the best available norms for each test. The ratio between the mental age so determined for each pupil, and the chronological age was then computed, and the result for convenience called the I. Q. These were found to range from 71 to 136, with the median of 100.9, or almost exactly average as compared with ordinary boys of the same age.

Report of Conference on Foremanship Training as Applied to the Manual Training Teacher's Job. Report of a conference held at the Oregon Agricultural College Summer School at Corvallis. The course had for its purpose the idea of bringing out the similarity in definite terms between the foreman's job and the teacher's job. In discussing the duties of supervisor and manager it was brought out that a manager corrects difficulties and his ability is measured in cost elements, while a supervisor spots difficulties and reports. The report discusses duties of the supervisor, desirable qualities of a teacher, responsibilities and place of the teacher in school and shop, and job analysis. It was decided that satisfaction depended upon the attitude of the teacher and the working conditions of the shop.